

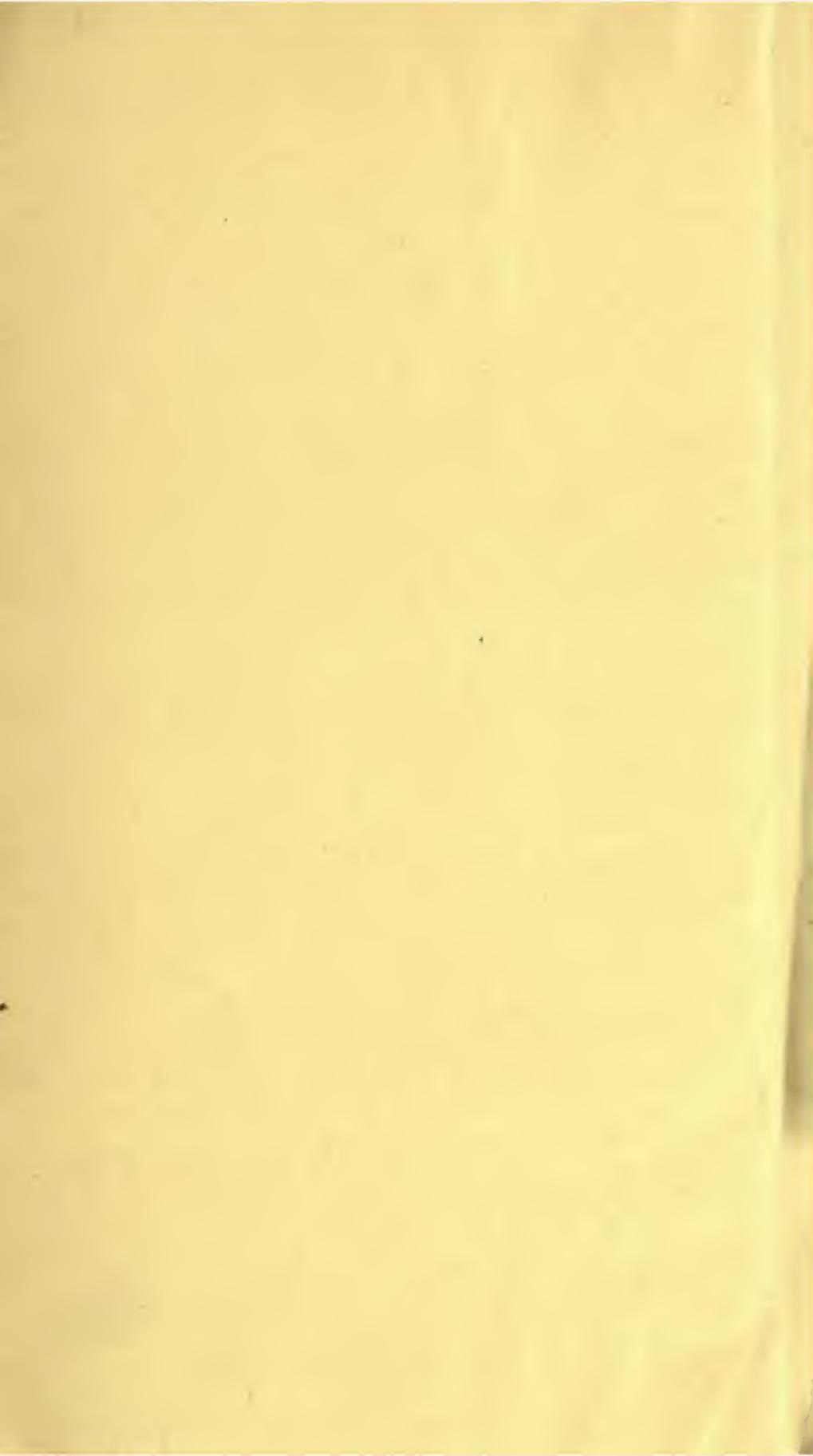
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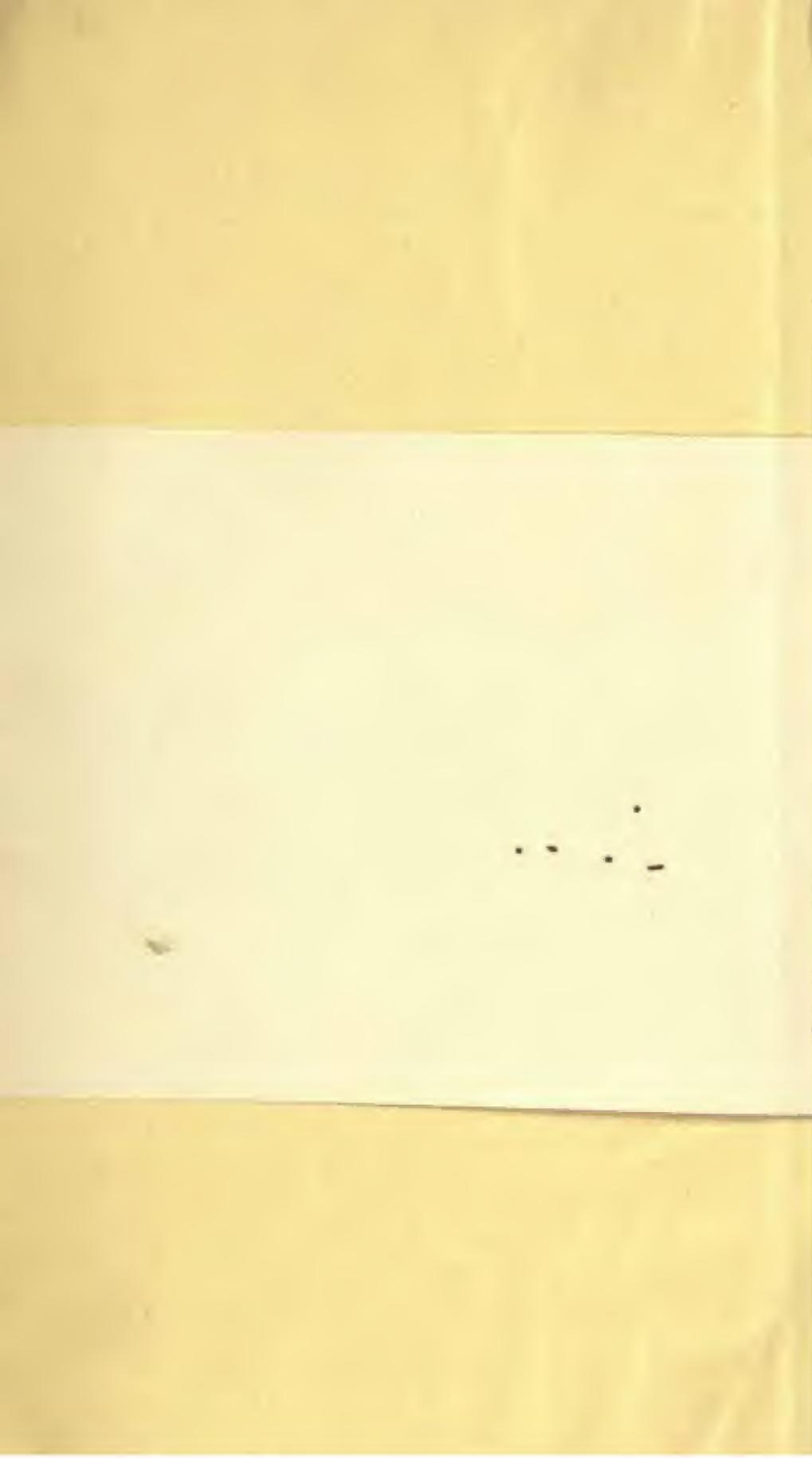
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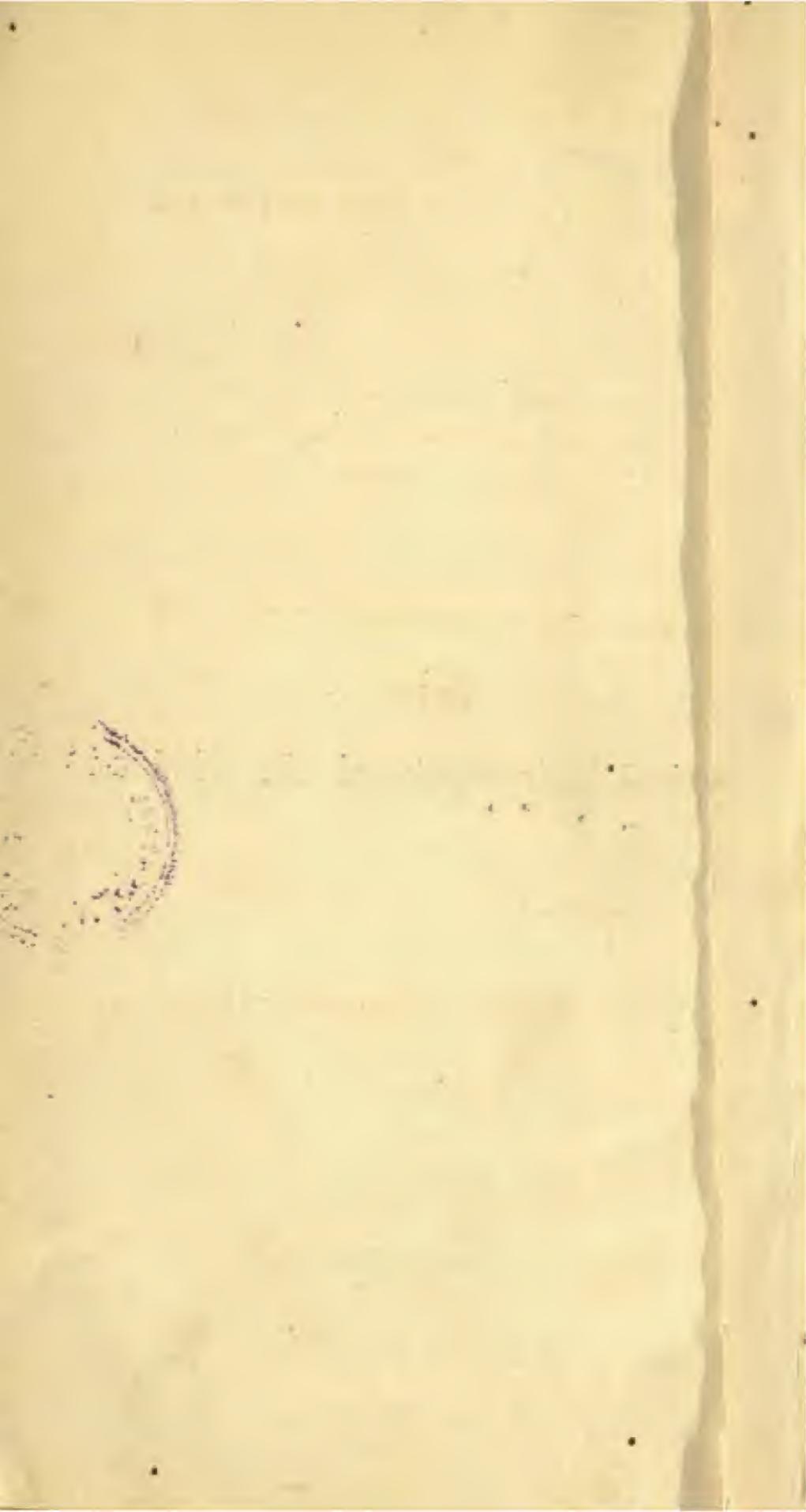


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THE
Surgical Instruments of the Hindus





THE
~~1579~~
**SURGICAL INSTRUMENTS
OF THE HINDUS**

WITH

8860

A Comparative Study of the Surgical Instruments of
the Greek, Roman, Arab and the Modern
European Surgeons.

BY

GIRINDRANĀTH MUKHOPĀDHYĀYA, B.A., M.D.

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Griffith Prize Essay for 1909.

In Two Volumes.

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VOL. I.

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TO
THE HON'BLE
SIR ASUTOSH MUKHOPADHYAY, Kt.,

Saraswati, Sastra-vachaspati,

C.S.I., M.A., D.L., D.Sc., F.R.A.S., F.R.S.E., F.A.S.B.,
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in Bengal.

VICE-CHANCELLOR, CALCUTTA UNIVERSITY.

Ex-President of the Asiatic Society of Bengal,

AND

Chairman of the Board of Sanskrit Studies,

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of University Education, his administrative ability, and his generous
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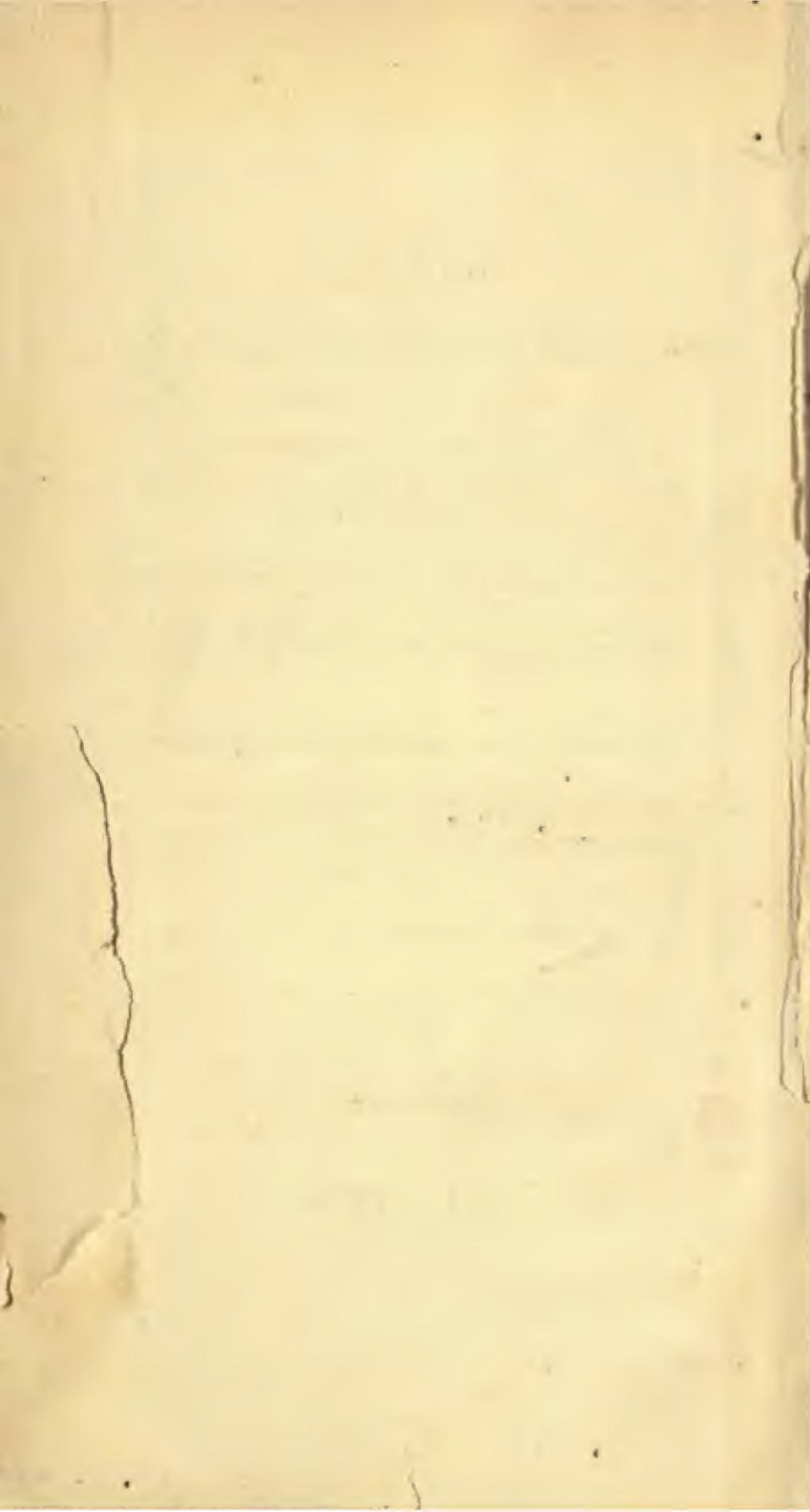
THIS VOLUME IS

DEDICATED

BY

THE AUTHOR





PREFACE.

For researches into the state of medicine among the Ancient Hindus, we have several sources of information to scrutinise. The remarks of Dr. Payne regarding the sources of information of Anglo-Saxon Medicine may apply here with still greater force.¹

First is the evidence of contemporary literature about the craft of physicians and surgeons, since we are sure that there has always been a class of medicine men of one kind or another. Thus we find in the R̄gveda, the use of artificial limb as a substitute for a limb accidentally lost². From the Mahābhārata,

¹ Payne's English Medicine in the Anglo-Saxon Times, P. 7.

² चरित्रे हि वैरिवाच्छेदि पर्यन्
आजा स्तेलस्य परितव्यग्रायाम् ।
सदां अङ्ग्रामावसौं विशपलायै
धने हिते सत्त्वे प्रत्यधत्तम् ॥

R̄gveda—15th R̄k., 1st Mandala, 116 Sūkta.

अगस्य पुरीहितः खेली नाम राजा तस्य सम्बन्धिनी विशपलानामस्त्री, संयामे
शुभिः किञ्चपदा आमीत् । पुरीहितेन अगस्येन सूती अविवनी रात्रि आगत्य आयोग्ये
पादं समधत्ताम् । तदेवदाह 'आजा'—आजौ, संयामे, अगस्य पुरीहितस्य—स्तेलस्य
राजतः सम्बन्धिन्या; विशपलाल्लाया, 'चरित्र'—चरण, 'वैरिव'—वै; पचिणः, 'पर्य' पत्रम्
इव, 'अच्छेदि हि'—पूरा किञ्चममृत् खलु । हे अविवनी! युवा अगस्येन सूती सन्तो,
'परितव्यग्राया'—रात्रौ, आगत्य, 'सदां'—तदानीमेव, 'सत्त्वे'—सत्त् गत्तम् इत्यादः;
विशपलायै 'आवसौं';—सौङ्गमयौम्, 'जङ्गा'—जङ्गीपत्रहितं पादम्, 'प्रत्यधत्तम्'—
सम्बानम् एकोकरणमित्यर्थः लक्षणान् ।

we learn that when Parikṣit, the king of the Kurus, became certain of his approaching death by snake-bite, due to a curse uttered by a sage, he tried to protect himself by the constant attendance of a number of physicians, who were well supplied with antidotes.¹ Again it is stated that when the great warrior Bhīṣma was wounded in war, the skillful army surgeons came to him with the necessary medical and surgical appliances to treat his wounds.² From the Mohāvāgga, we learn that Jivaka, the personal physician of Buddha, practised cranial surgery with success.³ In the Mālavikāgnimitra, we find the use of charms—a signet

¹ संमन्य भलिभिर्देव स तथा मनुष्यान्वितः ।
प्रामाण्ड वारयमास एकस्तम्भं मुरचितः ।
रक्षाच विदधे तत्र भिषजशीषधानि च ।
त्राद्धान्मालसिद्धांशुं सर्वतो देवयोजयत् ।

Mahābhārata, Adi Parva, Ch. 42.

² उपातिहवधीं दैवाः श्वलीहरणकोविदाः ।
सर्वोपकरणैर्दुक्ताः कुशलैः साधु शिक्षिताः ।
तान् हाता जामहीपुचः प्रीवाच तनयं तत्र ।
धनं दत्त्वा विस्तयन्ते पूजयित्वा चिकित्सकाः ।
एवं गते मर्येदानीं दैवाः कार्यनिहास्ति किं ।
चतुर्थर्थं प्रश्नातोऽहि प्राप्नोत्वा परमां गतिं ।
नैव धन्यो महीदालाः जरतलप्रवत्सय मे ।
परिवैश श्रेष्ठाङ्गं इम्बल्लोऽस्मि नरादिपाः ।
तत्कुला वचनं तस्य पुची दुर्बीधरमाल ।
दैवान् विसर्जयानास पूजयित्वा यथाइहतः ।

Mahābhārata, Bhīṣma Parva, Ch. 121,

Vs. 5745—5750. (A.S.B. Ed.)

³ Mohāvāgga, VIII. 1.18.

ring as a healing talisman for the cure of snake-bite;¹ and also we find there a reference to a class of physicians who specialised themselves in Toxicology (*Viṣa-Vaidya*),² and were held in high esteem for their professional skill by the public.³ From the *Bhojaprabandha*, the administration of some kind of anaesthetic by inhalation before surgical operations can be ascertained. Similarly from the books of Law, we know the relations of the profession to society in general. In the *Manusamhitā*, we have unmistakable testimony of the decline of Hindu surgery as the author prohibits the eating of cooked rice from the hands of a surgeon.⁴

¹ सहि ! देवीए इदं चिपिसात्तादौ आमोदत्यामसुहास्याहं अहुलीयचं चिपिहं चिभाल्यनी तृहं चवालमे परिदिग्निः ॥

Mālavikāgnimitra, Ch. I.

कथा ।—जिदु जिदु भट्ठा। घुबसिही विश्वेदी । उदकुमविधाणेण सप्तमुहिषा कपिदत्ता । ता अस्त्रोच्चदुत्ति । धारि ।—एष सप्तमुहिषम् अहुलीयभम् । पच्छा भइ हर्ये थम् ।

Ibid, Ch. IV.

² परि ।—हिंदी देशस्य दाही वा चातस्यारक्तमीचयम् । एतानि दद्मात्तात्ता-मातुष्याः प्रतिपत्तयः ॥ (संप्रति विषवैद्यानाम् कर्त्ता ।)

राजा ।—अयस्मै । भुवसिहिः चिप्रमाइयताम् ॥

Ibid, Ch. IV.

³ निपु ।—पसवमुहवशो दीपदि । अवि च घुबसिहिषा विश्वसिदी । ना से असहायिन्नं पावं ॥

Ibid, Ch. IV.

⁴ चिकित्सकान्देवलकान्मोस्त्रिकविष्यस्या ।

विपशेन च जीवतो वज्राः स्युर्हृत्यकव्यदीः ॥

Manusamhitā, Ch. III, 152.

चिकित्सकस्य शगधोः कूरम्बोच्छिटभीजिनः ।

उषादं दृतिकाङ्गं च पद्यांचालामनिदेशम् ॥

Ibid, Ch. IV, 212.

Secondly, monuments or inscriptions scattered about the country have to be searched, as references found therein to the science of medicine, are more trustworthy than documents which may have been more or less tampered with by interpolations of subsequent writers. Thus we learn from the Edicts of Asoka, that hospitals were established by him in different parts of his kingdom, not only for the treatment of suffering humanity but also for the brute creation¹.

Thirdly, personages and scenes in connection with medical practice, and figures of herbs may have been represented in works of art which must be thoroughly examined. But unfortunately we do not possess any such work of art and so we can learn nothing to our purpose from this source. In the interpretation of the subject of the Friezes of the Rani Naur and Ganesha's Cave, Dr. R. L. Mitra says,—“The shampooing in the Ganesha Cave may be for a parent, but the close seat with the right hand round the neck of the male personage in the other, would be highly unbecoming in an unmarried female. But if the stooping figure be taken to be that of a wounded man, a wounded priest for instance, the lady may be a maiden nursing him without any offence to propriety. It is true that the appearance of the figure on the mattress does not indicate suffering from a wound, but in the Rani Naur frieze, the stooping head affords some indication of it.”²

पृथे चिकित्सकस्याद्रं पुरुषास्त्वद्भिन्निध्यम् ।

विठा वार्ष्यिकस्याद्रं गत्विक्षयिणी नक्तम् ॥

Manusamhita, Ch. IV, 220.

¹ Rock Inscriptions, Edict II.

² The Antiquities of Orissa, Vol. II, p. 11.

Fourthly, the various kinds of surgical instruments preserved in museums are to be examined and the reports of finds of surgical appliances in various localities are to be studied. We know what a flood of light has been thrown on ancient Greek surgery by the steady progress of archaeological discovery and finds of instruments at Pompeii, Herculaneum and elsewhere, and by the study of the specimens preserved in the Naples museum, the Athens museum and other museums of Europe. But as far as I have been able to trace, our museums contain no finds supplying us with any information on the subject.

Fifthly, the literature of medicine itself should be thoroughly inquired into and excerpts elucidative of our subject should be compared with one another. "The detailed descriptions of the very numerous Hindu instruments not being very minute or precise, Professor Wilson says, we can only conjecture what they may have been, from a consideration of the purport of their names, and the objects to which they were applied, in connection with the imperfect description given."¹ We are fortunate, however, in possessing a copious medical literature of great merit from very early times. We shall describe the important books in the introductory chapter, with short notices of their authors.

Sixthly, the comparative study of the science at the same period in other countries also furnishes us with valuable materials as regards the state of medicine in a country. It is well known that Sanskrit works are often written in a very terse language

¹ Royle's Antiquity of Hindu Medicine, foot-note, p. 59-60.

and it might be said with greater truth about the works of early Sanskrit authors, the comment of a learned critic about the style of Thucydides, the famous historian,—“the most obvious and characteristic of his peculiarities is an endeavour to express as much matter as possible in as few words as possible, to combine many thoughts into one, and always to leave the reader to supply something of his own. Hence his conciseness often becomes obscure.” I could not form any idea as to the shape of some of the surgical instruments from the descriptions given in the text books, and the commentators are often silent on those passages. But when I read the accounts of similar instruments in Greek and Roman literature, my difficulties at once cleared up. We know with what brilliant results comparative mythology and comparative philology have been studied of late years, and I am sure that a comparative study of medical science by scholars will lead to interesting discoveries. So I have added descriptions of the instruments according to the Greeks, Romans and Arabs at the end of the descriptions given in Sanskrit books: the former serving as commentaries on the latter.

Seventhly, in the accounts of historians, travellers and pilgrims from foreign countries, may be found notices of medical science, as they saw it practised during their sojourn in a country, and such impressions, if properly collated, may bear impartial testimony to the progress of the science at the time. Again, we must enquire if the original treatises of medicine can be proved to have been translated into different languages and whether the remedial agents of a country can be traced in the Pharmacopeias of different nations. Thus we

learn from the accounts of Houen Tsang and Fa Hian that charitable institutions such as hospitals, dispensaries and Pūnyasālās (Houses of Charity) were quite common in ancient India.¹ Arrian informs us in his *Indica* that the study of medicine among the Brahmans was in great favour.² We know that the standard works on medicine were translated in Arabic in the 8th Century B. C.,³ and that various medicinal herbs of Indian origin found their way into the Greek *Materia Medica*.⁴

Eighthly, we must enquire whether the medical practice of ancient times is still resorted to by the physicians of the present days. The Hindu system of medicine is still being practised all over India, more or less in its original form, and so can still be studied at first hand. But for our present purpose, we derive little or no help from the *Vaidas* of the present generation. They know practically nothing about anatomy and surgery which began to decline during the Buddhist era, and finally all vestiges of the science became lost during the Mahomedan rule. I have spared no pains to exhaust these sources of information so far as surgical instruments are concerned. Whether or not I have been fortunate enough to give just the necessary details of instruments from the best accessible authorities without at the same time loading my pages with superfluous matter, must be left to the judgment of my readers to determine.

¹ Beal's Buddhist Records of the Western World, Vol. I., P. 165, 198 and 214; Vol. II., p. 188 and 303.

² Arrian's *Indica* c. 27.

³ Alberuni's India, Sachau's Preface, p. XXX—XXXI.

⁴ Royle's Antiquity of Hindu Medicine, p. 77-113.

Now it may be asked why the Science and Art of Surgery, which was successfully practised in Ancient India, is so much neglected by the present generation of *Vaidas*. So let us consider the causes that led to the downfall of Hindu Surgery:

1. The Hindus from a very early period have given up the dissection of human bodies—the only trustworthy method of acquiring anatomical knowledge—merely because it may occasion ceremonial uncleanness. The Ancient Hindus were, however, free from such prejudices. Manu lays down that mere bathing will purify a Brahman who has touched a corpse,¹ whilst stroking a cow or looking at the Sun, having only sprinkled his mouth with water will remove the defilement due to touching a dead bone.² But even in the *Manusamhitā*, we can trace the decline of Hindu surgery, and his law forbidding any one from eating food from the hands of a doctor evidently refers to a surgeon.³

2. The interference of the priests in India, as in Europe played an important part. They began to cure diseases by spells, charms, texts and drugs; and temples have served as consulting rooms for the treatment as much of the diseases

¹ दिवाकोर्जिसुदकां च पतितं मृतिका तथा ।

अर्थं सरस्पृष्टिमें चैव अृषा आनेन गुणति ॥

३

The Institutes of Manu, Ch. V, 85.

² नारं मृदाश्च सखेऽहं यात्वा विद्धो विद्युत्यति ।

आश्वमैव तु निषेऽहं गामात्माकं मीद्यत्वा ॥

Ibid, Ch. V, 87.

* Ibid, Ch. III, 152; Ch. IV, vs. 212 and 220.

of the body as of the soul. The example of such a temple we still find in Tārakeśvar where many sick people repair to have their maladies cured by dreams, hypnotic suggestions and incubation or temple-sleep. Similar practice was prevalent in Egypt and Greece in olden times. The modern practice of using galvanic rings and abdominal belts is merely an advanced method of indulging in superstitious ideas.

3. The patients always dreaded the surgeon's knife—especially when the use of a general anæsthetic was unknown. At the same time, the comparative success of poultices, actual and potential cauteries, and other external applications have influenced the lay mind that operations by knife are not always needed.¹ The Hindu surgeons themselves believed in similar tenets, for Suśruta, the surgeon, remarks that "of all cutting instruments and their substitutes, caustics (or vegetable alkalies) are the most important, because by means of them, deep and superficial incisions and scarifications may be made, and derangements of the three humours (air, bile and phlegm) may be rectified"; and again he says that "with

१ दिव्यीषधि दिना देवि शस्त्रविदा सुनिष्कला ।
 वैद्य कुरते या च इषिकितस्य अधानरे ॥
 जायन्ते हि यथाग्रांसि पाठिसानि पुनः पुनः ।
 किं तत्र शस्त्रसायं स्वात् सुसिद्धेषजैर्विना ॥
 धातुनां व्यापदि यज्ञ भेषणे नेत्र सिद्धति ।
 श्यामये दुर्सरे तक्षिण् शशमेव विधीयते ॥
 पुनः संश्लनं तत्र धातुनाम् हि प्रशान्तये ।
 प्रदातव्ये महादेवि शस्त्रादब्दाक् ब्रौमि से ॥

Mahānilatatantra, Paṭola X, vs. 72-74.

regard to surgical treatment, actual cautery is said to be superior to caustics, in as much as diseases treated with the actual cautery do not reappear, and because it can cure diseases which are incurable by medicines, instruments and caustics.”¹ Thus we see that the Hindus were partial to external applications as a cure of surgical diseases, and gradually they neglected the surgical operations—one of the most important means of acquiring knowledge in Morbid Anatomy and of testing the correctness of diagnosis, in the absence of the post mortem examinations of the cadavers. Thus not only surgery but medicine also suffered materially.

4. The Hindus always cherish a high regard for the writings of their sages, and the earliest works on medicine became the standard works and were held sacred. Any violation of their opinions was considered a sacrilege; and all knowledge thus soon became stereotyped. In later times, none dared to question the validity of the statements contained therein, and though about three thousand years have elapsed, and though the votaries of the science are still honoured and wellpaid, the science instead of improving has markedly deteriorated. In fact, only two authors—Caraka and Suśruta—are original; the later authorities—and there is a vast number of them—were merely their servile copyists who only differed from them when they indulged in some grave errors. We have a parallel in the history of medical science in Europe, where Galen

¹ साराद्विग्रन्थीवान् क्रियात् व्याहृतस्तद्याना रीतानामपुनर्भवात्पञ्चशत्त्वारेत् साध्याना तत्साध्यत्वात्।

held his sway over the profession for about two thousand years.

5. One of the potent causes of progressive decadence in the knowledge and practice of surgery amongst the Hindus is the rapid spread of Buddhism in India. Though Buddha sanctioned the use of the lancet in some cases, in cases of a doubtful nature he prohibited the use of instruments in the treatment of even surgical diseases. For example, he allowed the surgical treatment of boils by knife,¹ but he prohibited not only the use of the lancet for treatment of fistula-in-ano but the use of clysters also.² As it would be interesting to know the reasons of this prohibition, I quote the story in full from the *Mohāvāgga* (Sacred Books of the East):³

1. Now when the Blessed One had remained at Sāvatthi as long as he thought fit, he went forth on his journey to Rāgagaha ; and wandering straight on he arrived at Rāgagaha; and there at Rāgagaha he stayed at the Veluvana in the Kalandaka-nivāpa.

Now at that time a certain Bhikkhu was suffering from fistula. And the physician (named) Ākāsa-gotta lanced it. And the Blessed One when he was going round through the sleeping-places came to the place where that Bhikkhu dwelt.

2. Ākāsa-gotta, the physician, saw the Blessed One coming from afar; and when he saw him he said to the Blessed One : ' Let the venerable Gotama come and look at this Bhikkhu's orifice ;

¹ *Mohāvāgga*, VI. 14. 4 & 5.

² *Ibid.* VI. 22. 3.

³ *Ibid.* VI. 22.

it is like the mouth of an iguana !' And the Blessed One thinking, 'This foolish fellow is making fun of me,' kept silence and turned away. And in that connection, and on account of that, he called a meeting of the Bhikkhu-samgha, and asked the Bhikkhus: 'Is there, O Bhikkhus, in that Vihāra a Bhikkhu who is sick ?'

'There is, Lord.'

'What is the matter, O Bhikkhus, with that Bhikkhu ?'

'That venerable one, Lord, has a fistula, and Ākāsa-gotta the physician, has been lancing it.'

3. The Blessed Buddha rebuked (that Bhikkhu), saying, 'This is improper, O Bhikkhus, for that foolish one, unbecoming, indecent, unworthy of Samanas, not allowable and ought not to be done. How can this foolish fellow, O Bhikkhus, allow a surgical operation to be performed in that part of his body ? The skin there, O Bhikkhus, is tender, the wound is difficult to treat, the knife is difficult to guide. This will not redound, O Bhikkhus, to the conversion of the unconverted.'

And having rebuked him, the Blessed One, after delivering a religious discourse, said to the Bhikkhus: 'You are not, O Bhikkhus, to allow a surgical operation to be performed upon you in that part of your bodies. Whosoever allows that, is guilty of thullakkaya offence.'

4. Now at that time Khabbaggiya Bhikkhus, since a surgical operation had been forbidden by the Blessed One, used a clyster.

They told this thing to the Blessed One.

'Is it true, as they say, O Bhikkhus, that the Khabbaggiya Bhikkhus use a clyster ?

'It is true, my Lord.'

He rebuked them, and having delivered a religious discourse, said to the Bhikkhus: 'No surgical operation is to be performed within a distance of two inches round the anus, and a clyster is not to be used. Whoever does so, is guilty of a thullakkaya offence.'

And thus we find that Jivaka, the famous surgeon, is said to have cured a case of fistula-in-ano by the single application of an ointment.¹ The operation fell into such disuse that when Śāṅkarāchāryya suffered from the same disease, no surgical aid was thought necessary by the physicians, though it is said that he was treated by renowned doctors of the time.²

From Megasthenes,³ we learn that "among the Sarmans the Hylobioi (living in woods) were held in most honour, and next to them the physicians, who are mendicants and also ascetics, like the class above them and the class below them,

¹ "And Givaka Komārabhakka healed the fistula of the Magadha King Soniya Bimbisāra by one anointing."

Mohāvīgga (Sacred Books of the East), VIII. 1. 15.

² अचिकित्सयभगन्दराव्यरीग्रपसरक्षीयितपदिलस्तशाश्वाः ।

अनुग्रह्यविजीवनादिरूपो परिच्छान्तङ्गताऽस्य तीटकार्यः ॥

* * * * * * *

निगदिते मुनिनेति भिषग्वरा विदधिरै वहधागदसत् कियाः ।

न च ग्राम नदीवहुतापदीविमनसः पटबी भिषजीऽभवन् ॥

which consisted of sorcerers and fortune-tellers;¹ and Strabo² mentions that these physicians "cured diseases by diet rather than by medicinal remedies, which were chiefly unguents and cataplasms."³

6. No science can flourish without the support of the government of the day. The Hindus became a subject race; and any departure from the traditional store of knowledge in the shape of improvement in the quality and additions to its quantity was neither tolerated by the people, who are proverbially conservative, nor countenanced by the royal court, for the conquerors brought with them and patronised their own hakeems and doctors. Neither the Mahomedans nor the English have taken any real interest in the Indian Medical Science from preconcieved notions that it contains nothing worthy of their perusal. The *Kavirajes* again are so conservative in their opinions that they can not boldly advocate even the use of such drugs as are of unquestionable value in the treatment of diseases, as for example the use of Quinine in Malaria. To this may be contrasted the behaviour of Bhāvamīśra, who lived about three hundred years back and, who adopted many medicaments of foreign origin. The consequence can easily be imagined, and in the language of Elphinstone, can be thus described: "Physicians follow the practice of their instructor without inquiry, and surgery is so far neglected, that bleeding is left to the barber, bone-setting to the herdsman, and every one is ready to administer

¹ The Invasion of Alexander the Great. M'Cordle. Appendices. p. 358.

² Geography, XV. i. 58-60.

³ The Invasion of Alexander the Great. M'Cordle. Appendices. p. 368-69.

a blister, which is done with the juice of the euphorbium and still oftner with the actual cautery."¹

But we need not enlarge any further. The object of this essay is not to write out an exhaustive dissertation on the Hindu medical science but by a few suggestive facts, however imperfect and fragmentary, to stimulate curiosity and divert attention of the diligent scholars to a vast field of research, which seems as yet to have been only partially explored.

It is proper here to acknowledge that I have on all occasions freely availed myself of the labours of Drs. Wise, Thakore Saheb of Gondal, and the translators of *Suśruta Samhitā* in the *Bibliotheaca Indica*, namely, Dutt and Hoernle. It is a great pity that this translation has not as yet progressed beyond three fasciculi. Hoernle's recent contribution, "Osteology of the Hindus," is a move in the right direction and we hope it to be followed by similar enquiries in other branches of the science. Royle for the first time proved beyond doubt the high antiquity of Hindu medicine, and established its right position in the history of the science. Wise is the pioneer of systematic research in this field of study, and his sympathetic appreciation of the Hindu system of medicine will always be remembered with gratitude by our countrymen. Dutt's *Materia Medica of the Hindus* is a work of great merit; and I have derived material assistance from the excellent treatise, "History of Aryan Medical Science," by the Thakore Saheb of Gondal. Dr. Ray's History of Hindu Chemistry is a valuable contribution in the cognate subject of chemistry. I have borrowed from these writers largely, but

¹ Elphinstone's History of India, 5th Ed., p. 160.

I flatter myself it will also be found that I have further collected from various sources a store of valuable information, for which I am in no way indebted to any of my predecessors in the same field of research. The descriptions of the surgical instruments of the Greeks, the Romans and the Arabs, I have taken from the excellent English translations of Paulus *Aegineta*, the Extant Works of *Aetius* and the Genuine Works of Hippocrates, prepared by the renowned Adams, for the Sydenham Society. I have also laid the recent monograph, "Surgical instruments in Greek and Roman times" by Dr. Milne, largely under contribution; I only regret that I had no access to the book a little earlier, otherwise much of my labour in search for descriptions of the instruments of the Greeks would have been saved. For the last five years, I have been engaged on this investigation and it was when I had nearly finished, that Milne's book was mentioned to me by the Hon'ble Mr. Justice Asutosh Mookerjee, the Vice-Chancellor of the Calcutta University and the President of the Asiatic Society of Bengal.

To complete the subject, I have added plates of nearly all the varieties of instruments; but they are more or less hypothetical as we do not possess any actual specimens of the instruments of the Hindus. Written descriptions of surgical instruments are uninteresting and often fail to convey the true idea, which could be easily made evident by the pencil. For purposes of comparison I have given drawings of instruments of the Greeks, the Romans and the Arabs, when I thought that they might be of value for the proper elucidation of my subject. I am indebted to many authors

I am indebted to many authors for some of the engravings of the instruments. I have been careful to give the source whence the borrowed ones are taken, as far as I have been able to ascertain them. If this has been omitted in any case, it is from inadvertence, not from design. My best thanks are due to them and I here acknowledge my indebtedness to the authors for availing myself of their labours without their permission. But many new illustrations will be found, and I have appended my name to those drawn by myself. These figures of the surgical instruments would be found to tally better with the descriptions of the instruments given in the Sanskrit books than the illustrations of the previous authors. The drawings of surgical instruments as given by me would look more like the figures in a modern catalogue of surgical instruments. Some of my friends could hardly believe when they saw the plates that these instruments were known to the ancient Hindus at such an early age. This feeling of amazement and incredulity as regards the surgical instruments used by the ancient Hindus has its parallel in the observations of Billroth¹ about the surgical instruments found in the excavations at Pompeü and now preserved in the museum at Naples. He says: "It made a peculiar impression upon me; when I saw before me this two thousand years old surgical armamentarium of a Roman colleague, differing but slightly in the form of the more ordinary instruments from those of our time. *Ars longa vita brevis.*" Milne² also remarks: "The works of those (Paré, Scultetus and Heister) are profusely illustrated with instruments, some of which can plainly be seen to tally exactly with the descriptions of the classical authors."

¹ Billroth's Surgery, Vol. I, Introduction, Page 7. Syd. Soc. Ed.

² Graeco-Roman Surgical Instruments, P. S.

In describing the surgical instruments, I have confined myself strictly to the texts of the authors and commentators whom I have quoted, and have given the original Sanskrit passages in the foot-notes. These will be of great help to scholars who will try to study the subject at first hand, and prosecute further historical inquiries. The references in the foot-notes do not refer to pages of any particular edition of the work, as such pagination causes inconvenience to the readers who may not secure the edition in question; so we have given the section, and chapter of the book which will be found in any edition.

In the translations of Sanskrit passages, I have endeavoured to follow the original as closely as possible, except where a somewhat free rendering was necessary to make the meaning clear.

The dates of the ancient Hindu authors of Sanskrit medical books cannot be ascertained with certainty. In the first chapter I have endeavoured to discuss briefly their approximate ages. But as I have compared the surgical instruments of the ancient Hindus with those of the Greeks, Romans and Arabs, a concise summary of the chronological dates of the Graeco-Roman, Arab, and the later authors would be a great help in the proper elucidation of my text.

<i>Authors.</i>	<i>Date.</i>
Pythagoras	... 580-504 B.C.
Megasthenes	... 300 B.C.
Ktesias	... 400 B.C.
Hippocrates	... 460 B.C.
Hero of Alexandria	... 285-222 B.C.

<i>Authors.</i>	<i>Date.</i>
Dioscorides	... First century A.D.
Celsus	... 25-30 B.C. to 45-50 A.D.
Scribonius Largus	... 45 A.D.
Soranus	... First century A.D.
Rufus of Ephesus	... 98-117 A.D.
Galen	... 131-201 A.D.
Marcellus Empiricus	... 300 A.D.
Antyllus	... 3rd century, A.D.
Oribasius	... 326-403 A.D.
Theodore Priscianus	... 4th century A.D.
Caelius Aurelianus	... 4th or 5th century A.D.
Mosehion	... 5th century A.D.
Actius	... 5th century A.D.
Alexendar of Tralles	... 525-605 A.D.
Paulus Ægineta	... 660 A.D.
Serapion	... 800 A.D.
Rhazes	... 850-932 A.D.
Haly Abbas	... After 950 A.D.
Avicenna	... 980-1037 A.D.
Abul Cassim	... c 1106 A.D.
Avenzoar	... c 1162 A.D.
Paré	... 1509-90 A.D.
Scultetus	... 1650 A.D.
Heister	... 1739 A.D.

I can not suffer this work to go forth without offering at least an explanation of, if not an apology for, the delay which has occurred in the publication of this thesis. It is mainly due to the accidental fire which reduced the types and the blocks

for this work to ashes and destroyed a part of the manuscript. This portion had to be written again. Again the task of reading proof sheets was laid on me entirely. The occupation of a laborious profession encroached on my time; and I was not fortunate enough to secure the co-operation of any worker in this field of research. The result might be anticipated and no one is more conscious of the unsatisfactory issue than myself. I had no experience in proof reading, and so mistakes are not uncommon. Some of the errors will be found corrected in the corrigenda. As regards the corrections of many of the proof sheets of the Sanskrit foot-notes I was assisted by my son Hirendranāth Mukhopādhyāya, who helped me much in getting this book completed. The author will feel obliged if informed of any errors that may be detected and of references to informations which ought to have been given, and also for any hints that may make a future edition more useful to the readers. But I have this consolation in my mind that I have not pushed this work through the press hurriedly or prefunctorily and I have done my best. I have laboured with the usual drawbacks of an active professional life and if this be admitted by the critic as an excuse for errors and failures, I shall be grateful to him.

A copious index has been provided for this work, whereby anything material in the whole book may be readily found out; of which it may be said that it wants no other advantages than such as the author had not power to give.

It would not be out of place here to mention that part of this essay was read before the Asiatic Society of Bengal in June, July and August, 1908. The learned President in his annual address remarked as follows: "In the course of the last

session Dr. Girindranath Mukerjee submitted to the society a paper of considerable extent, in which he elaborately examined the subject of the surgical instruments of the ancient Hindus. The questions he has raised, as to the priority of Hindu medicine over that of the Greeks, the Romans and the Arabs, are likely to arouse controversy, but in whatever way the question of priority may be decided, it seems to me truly remarkable that the descriptions given in our most ancient books on medicine, of the surgical Instruments then in use, should bear a close resemblance to the descriptions given not only in Greek, Roman and Arab medical writings but in many cases with the descriptions given in modern works on surgery. I trust that this subject, so peculiarly Indian, will not be left alone and will receive the attention from investigators which it undoubtedly deserves."¹

As regards the transliteration of Sanskrit words, we have employed the method adopted in the Congress of Orientalists and circulated in the Journal of the Royal Asiatic Society, ignoring in fact, the unpleasant characters of the Sacred Book of the East.

¹ Journal and Proceedings of the Asiatic Society of Bengal, Vol. V, 1899, Annual Address, p. XXX.

I

SANSKRIT AND ALLIED ALPHABETS.

अ	<i>a</i>	ओ	<i>o</i>	ट	<i>t</i>	ब	<i>b</i>
आ	<i>ā</i>	औ	<i>au</i>	ठ	<i>th</i>	भ	<i>bh</i>
इ	<i>i</i>	क	<i>k</i>	ड	<i>d</i>	म	<i>m</i>
ई	<i>ī</i>	ख	<i>kh</i>	ढ	<i>dh</i>	य	<i>y</i>
उ	<i>u</i>	ग	<i>g</i>	ण	<i>ŋ</i>	र	<i>r</i>
ऋ	<i>ū</i>	घ	<i>gh</i>	त	<i>t</i>	ल	<i>l</i>
ऋ	<i>ṝ</i>	ঢ	<i>n̄</i>	ঘ	<i>th</i>	ব	<i>v</i>
ঢ	<i>ର̄</i>	চ	<i>c</i>	দ	<i>d</i>	ঝ	<i>ঝ</i>
ঢ	<i>ଚ̄</i>	ছ	<i>ch</i>	ঘ	<i>dh</i>	ষ	<i>ষ</i>
জ	<i>ଜ̄</i>	জ	<i>j</i>	ন	<i>n</i>	স	<i>s</i>
এ	<i>e</i>	ঝ	<i>jh</i>	প	<i>p</i>	হ	<i>h</i>
ঐ	<i>ai</i>	ঙ	<i>ñ</i>	ফ	<i>ph</i>	ঙ	<i>l</i>

• (*Anusvāra*) . . . *m̄** (*Anunāsika*) . . . *m̄*: (*Visarga*) . . . *b̄*× (*Jihvāmūliya*) . . *b̄*☒ (*Upadhmāniya*) *b̄*s (*Avagraha*) . . .

Udātta

Svarita

Anudātta

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and commentaries. Vāgbhaṭa I.—Aṣṭāṅga Saṅgraha, his age, edition and commentary; Vāgbhaṭa II: Aṣṭāṅga Hṛdaya Saṅhitā, editions and commentaries; Vāgbhaṭa III—Rasa Ratna Samuccaya; Mādhavakarṇa:—Nidāna; Vṛnda Madhava:—Śiddhayoga; Cakrapāṇi-datta:—Cikitsāśāstra Saṅgraha, editions; Śāraṅgadhara:—Śāraṅgadhara Saṅgraha, editions and commentary; Bhāva Miśra:—Bhava Prakāśa, editions.

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Kraūcamukha or Curlew forceps. Bhṛūgarājā-mukha or Butcher-bird forceps. Añjalikarṇa forceps. Avabhañjanamukha forceps. Nandimukha forceps. II. The Sandatīśa or Pineher-like forceps: Forceps with and without handles. Forceps with Smooth and rough ends. Epilation forceps. Mueuṭi or Mucundi. Vatiśabidala or Bamboo forceps. III. Tāla-Yantra or Picklock-like instrument: Eetāla and Dvitāla. The Ear-scoop. IV. The Naḍī-Yantra or Tubular instruments: Kauṭhaśalyā-valokini or Throat speculum. Pañcamuka and Trimukha. Tubular instruments for inspection of arrows. Śalyanirghātāni. The Impellant. Tubular instruments for Piles—for inspection and medication. Śamī. The Rectal Speculum. Calopter. Tubular instruments for the Fistula-in-ano. Tubular instruments for the nose: Nasal Speculum. Natha-lzārāni and Yamaka-nathu-karāni. Nasal tubes. The Aṅguli-trāṇaka or Finger-guard. Yoni-Vraṇekṣana or Vaginal Speculum. Diopter. Bivalve Speculum. The tubular instruments for wounds—Vrāṇa-vasti or Wound-Syringe. Tubular instrument for ascites. Dākodara yantra or Canula. Tubular instruments for Hydrocele. Tubular instruments for rectal stricture. Tubular instruments for injection into the rectum—Vasti Yantra or Rectal clyster. Uttaravasti or urethral, vaginal and uterine tubes. Catheters. Tubular instruments for inhalation and fumigation. Disinfection of rooms, clothes &c. Tubular instruments for cupping. Śrṅga or horn. Alābu Yantra or gourd. Ghati Yantra. V. Salakā

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"	xiii "	" 1	<i>read</i> Mahāvṛgga <i>for</i> Mohāvṛgga.
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"	xiii "	" 2	Vijoyn Vejoya.
"	xv "	" 1 & 2 }	Bibliotheen Bibliotheca.
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			Mortar Mortar.
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"	<i>178</i>	<i>item</i>	<i>10</i>	<i>...</i>	"	<i>Cīna</i>	"	<i>China.</i>
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"	<i>221</i>	<i>item</i>	<i>3</i>	<i>...</i>	"	<i>Pācana</i>	"	<i>Pāchana.</i>
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"	<i>262</i>	<i>"</i>	<i>10</i>	<i>...</i>	"	<i>Round...four cornered</i>	"	<i>four cornered... round.</i>
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"	<i>295</i>	<i>"</i>	<i>3</i>	<i>...</i>	"	<i>Requisites</i>	"	<i>Requisities.</i>
"	<i>306</i>	<i>"</i>	<i>11</i>	<i>...</i>	"	<i>Yagṭhi</i>	"	<i>Yaṭṭi.</i>
"	<i>311</i>	<i>item</i>	<i>2</i>	<i>...</i>	"	<i>octagonal</i>	"	<i>octogonal.</i>
"	<i>328</i>	<i>"</i>	<i>3</i>	<i>...</i>	"	<i>hātā</i>	"	<i>hata.</i>
"	<i>331</i>	<i>line</i>	<i>18</i>	<i>...</i>	"	<i>Jolly</i>	"	<i>Jolley.</i>
"	<i>340</i>	<i>"</i>	<i>5</i>	<i>...</i>	"	<i>Physician</i>	"	<i>Physian.</i>
"	<i>346</i>	<i>"</i>	<i>18</i>	<i>...</i>	"	<i>amber</i>	"	<i>ambar.</i>
"	<i>348</i>	<i>"</i>	<i>2</i>	<i>...</i>	"	<i>Paitāmoha</i>	"	<i>Paitāmoha.</i>
"	<i>352</i>	<i>"</i>	<i>22</i>	<i>...</i>	"	<i>Firoz</i>	"	<i>Firroz.</i>
"	<i>354</i>	<i>"</i>	<i>11</i>	<i>...</i>	"	<i>Areca</i>	"	<i>Arecha.</i>
"	<i>355</i>	<i>"</i>	<i>12</i>	<i>...</i>	"	<i>Dvārusita</i>	"	<i>Davrusita.</i>

WORKS BY THE AUTHOR.

1. Muscles of the Human Body, arranged in Tabular forms.
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2. Tropical Abscess of the Liver.

Thesis approved for the degree of Doctorate in Medicine,
Madras University. Rs. 5

3. Glossary of Indigenous Medicinal Plants.

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CHAPTER I.

INTRODUCTION.

ANCIENT MEDICAL AUTHORS AND THEIR WORKS.

The Science and Art of Medicine, like many other different branches of learning originated with the Hindus. They consider the art of healing as an Upaveda and it is generally known as Āyurveda, that is the art of prolonging life. Like the Vedas, they trace the origin of the science to God, the fountain of all true knowledge. Brahmā transmitted this heaven-born science to this world, for benefit of the mortals in one of the sacred writings, the Āyurveda.

It was composed as a sub-division of the Atharva Veda and consisted originally of a *lakh* *slokas* or a hundred thousand stanzas, divided into a thousand chapters. Then considering the short span of life and inadequate intelligence of man, he divided the book into eight parts¹ as follows:—

¹ तद्यथा ॥ शालै शालाकं कायचिकित्सा भूतविद्या कौमारभवसगदतन्त्रम् रसायनतन्त्रं वाजीकरणतन्त्रमिति ॥

Suśruta Saṁhitā, I. i.

कायचिकित्सा शालाकं शालहनुं कं विषगरवं रोधिकप्रशस्त्रं भूतविद्या कौमारभवकं रसायनानि वाजीकरणमिति ।

Caraka Saṁhitā, I. xxx.

नेदो चायज्ञवः स्वस्य वृद्धिमहात्मा हीमनिदमपाचित्वात् पवासमनादिपरिवहात् चिकित्सा प्राप्तः ।

Ibid.

1. Śalya Tantra or Major Surgery.
2. Śālakya Tantra or Surgery of parts above the Clavicles.
3. Kāya Cikitsā or Inner Medicine.
4. Bhūtvidyā or Demnology.
5. Kaumārabhr̥tya or the Science of Paediatrics.
6. Agada or Toxicology.
7. Rasīyana or Treatment to prolong life.
8. Vājikarana or Treatment to stimulate the sexual power.

The book is no more available now, Suśruta being the authority for the above information.¹

A different view is held by others, who trace the origin of Hindu Medicine in the verses of the R̥gveda.²

¹ इह स्त्रावुर्वेदो नाम यदुपाइमवर्जनेदस्त्रात्पादैव प्रजाः द्वीकशतसहस्रमध्यायसहस्र लक्ष्यान् स्वयम् । ततोऽस्त्रायुइमत्तमेष्वनुचावलीका नराणां मृद्युऽष्टधा प्रखोत्तवान् ॥

Suśruta Saṁhitā, I. I.

तत्र चेत् प्रटारः सुः चतुर्शौककसामयजुरयर्जवेदानां कं वेदमुपदिग्नश्यायुर्वेदविदः । किमाधुः कस्यादायुर्वेदः किञ्चायामायुर्वेदः शास्त्रोऽक्षाश्चत इति । कानि चासाहानि क्षयायनप्रेतव्यः किमर्दचेति ॥

तत्र भिषजा एते नैव चतुर्शौकसामयजुरयर्जवेदानाम् आमनोऽयर्जवेदे भक्तिरादेष्य ।

Caraka Saṁhitā, L. xxx.

The origin of medical science, as quoted in the above passage of Caraka, does not however agree with the view expressed by the author in the Sūtra Sthāna, Ch. I. (See footnote 1. P. 4). In Ch. XXX, we find that an attempt had been made to make a compromise between the two views of Agniveśa and Suśruta. Evidently this was the work of a later redactor, possibly Dṛḍhavala.

न चायुर्वेदस्त्रात्प्रतिक्षपत्वमते । अन्यत्रावरीधीपदेश्चाभ्यमितदे इयमधिक्षय उत्तम-
मुपदिग्नव्येके सामाविक्तासां लक्ष्यमधिक्षय यदुक्तम् इह चायोचापादे ॥ ॥ ॥

Caraka Saṁhitā, L. xxx.

² चतुर्वेदस्त्रायुर्वेद उपर्वेदः ।

Caraka Vyūha by Vyāsa-

ATHARVA VEDA.

"On examining the contents of the Atharva Veda more in detail, we find that the hostile charms it contains are directed largely against various diseases or the demons which are supposed to cause them. There are spells to cure fever (*takmān*), leprosy, jaundice, dropsy, scrofula, cough, ophthalmia, baldness, lack of vital power, fractures and wounds; the bite of snakes or injurious insects, and poison in general; mania and other ailments. These charms are accompanied by the employment of appropriate herbs. Hence the Atharva Veda is the oldest literary monument of Indian Medicine."¹ This Veda can not belong to a period later than 1000 B. C., but possibly earlier.² It exists in the recensions of two different schools. That of the Paippalāda is only known in manuscript, discovered by Prof. Buhler in Kashmir and described by Prof. Roth in his tract *Der Atharva Veda in Kaschmir* (1875). The printed text, edited by Roth and Whitney in Berlin 1856, gives the recension of the Śaunaka School.³ It has been translated into English Prose by Whitney, 2 Vols.; into English verse by Griffith, 2 Vols., Benares, 1897, and with the omission of the unimportant

¹ Madonnel's Sanskrit Literature, P. 196.

अथर्ववेदस्य ०००० चतुर्थं वेदवेदपि प्रायेषाभित्वारव्यर्थलाद्यज्ञविद्यायामनुप-
योगाज्ञानिङ्गमः । सयाहि अथवेदेनैव हौषधे कुञ्जे यजुर्वेदनाध्यावे सामवेदनौद्धारे
यदेव चर्यै विद्याय सूक्तनैव ब्रह्मत्वमितिशुते स्त्रीसम्पाद्यते यज्ञानां जायते ।

Kallīka Bhaṭṭa's Commentary on *Manu Smṛiti*, Ch. III, Śloka I.

² On the date of Atharva Veda, see pp. CXL—CLXI, Prof. Lanman's Edition of Whitney's Transl.; Prof. Madonnel's Sanskrit Literature, pp. 185—201.

³ Index *Vervorum* in the Journal of the Am. Or. Soc. Vol. XII.

hymns, by Bloomfield¹ into English Prose, with notes, in Vol. XLIII of the Sacred Books of the East.

CARAKA SAṂHITĀ.

In the Caraka Saṁhitā we find that Brahmā taught Dakṣa the science of medicine; Dakṣa became the preceptor of the Aśvin twins; they in their turn became the teachers of Indra and Indra imparted this knowledge to Bharadvāja who was sent by a conclave of sages to learn the art for the welfare of the human race.² Bharadvāja had Punarvasu Ātreyā and the others as disciples. Ātreyā's students were Agniveśa, Bhela, Jatukarṇa, Parāśara, Hārita and Kṣārapāṇi, all of whom became celebrated as the authors of treatises on Medicine; the Caraka Saṁhitā being a revised and improved edition of the treatise of Agniveśa, which was declared to be the best production.³ Caraka did not, however, redact the whole

¹ He has also edited the Kauñika Sūtra of the Atharva Veda, with extracts from the commentaries of Dārīta and Keśava (see Vol. XIV Journ. Am. Orient. Soc.). It is very useful as a help to the proper understanding of the meaning of a hymn.

² दीर्घोवितमन्तिष्ठानं भरदाव चपाममत् ।
वृन्दसुयतपा तु दा भरदावमर्तेष्वरम् ॥
ब्रह्मणा हि यथा ग्रीकमायुर्वदं प्रजापतिः ।
जयाह निखिलं नादाविविनो तु पुनमतः ॥
चत्रिवभ्यां भगवान् ब्रह्मः प्रतिषेदं ह कैवलम् ।
स्वविश्रोक्तो भरदावस्था चक्रमुपागमत् ॥

³ अथ मंत्रोपरः पुराणायुर्वदं पुनर्वद्युः ।
गिर्विद्वी दहवान् यहमः सञ्जभतानुकृत्यथा ॥
अधिवेशव भेलव जतुकर्णः पराशरः ।
हारीतः चारपाणिव जटहस्तमुनर्वचः ॥
तुहेर्विशेषलक्ष्मीशोपदेशान्तरं मुनेः ।
तत्स्य कल्पी प्रथमसिंहेशो यतीभवत् ॥
अथ भिलादवयवकु म्यं स्तं तत्वं ततानि च ।
वालयामासुरावेशं सर्विसर्वं मुनेभसः ॥

Caraka Saṁhitā, I. i.

Ibid., I. i.

book;—the last forty-four chapters¹ were edited by Dr̄dhabala,² a native of Panchanadapura, long supposed to refer to Punjab (the land of five rivers) but at present identified with a town in Kashmir by Dr. Hoernle.³ Two other works, the treatises of Bhela and Hārita, are still extant; the former existing in manuscript in the Tanjore Library⁴ and the latter as printed texts by *Kavirājae* K. C. Sen and B. L. Sen, of Calcutta.⁵

Now as regards the age of Caraka, there is great divergence of opinions. The Indians generally believe him to be a Ṛṣi of great antiquity while the European scholars try

¹ For a discussion on the part added by Dr̄dhabala, see Hoernle's Studies in Ancient Indian Medicine, J. R. A. S. 1908, P. 997-1002. Also see pp. 11-15 in the *Vanaugadhi Darpana*, Vol. I., by *Kavirāja Birajā Charan Gupta*, 1908.

² अतस्मीन्मिदं चरकेशातिकृदिनः ।

संस्कृतं तत् तु संस्कृतं विभावेनीपत्रव्यते ॥

इदमनूग्राद्युषं ततोऽदीर्घविवर्जितं ।

अस्मद्गाथं हडवली जातः पचनदे पूरे ॥

जला वह्यस्तन्मध्ये विशेषात् वलीभयम् ।

समदशोषधायायमिदिकर्पैरपूर्वत् ॥

Caraka Saṁhitā, VIII, xii.

* अथिन् समदशायायः कल्पाः सिद्धय एव च ।

नासाद्यन्ते द्विवेशस्य ततो चरकसंस्कृते ॥

तानेतान् कापिलवलः शेषान् हडवलीकर्णीत् ।

तनस्यास्य महाद्युष्यं पूर्वार्थं यथातयम् ॥

Ibid, VI, xxx.

* Hoernle's Studies in the Medicine of Ancient India, Part I, Osteology. Introduction, p. 2. See also his article on "The authorship of Caraka's Saṁhitā" in the *Archiv für die Geschichte der Medizin*, 1907.

* See Burnell's Tanjore Catalogue No. 10773 of Sanskrit MSS., P. 63.

* It is doubtful whether the Hārita Saṁhitā is the genuine work of the Ṛṣi, Hārita. The printed text refers to Caraka, Suśruta and even Vāgbhaṭa, who were decidedly posterior to Hārita. See the Footnote 3, P. 6.

to connect him with historical events of more modern times. Sylvain Lévi has recently discovered in the Chinese Translation of the Buddhist *Tripitaka* that Caraka was the Court Physician of the Indo-Seythian King Kaniṣka, in the first century A.D.¹ But the following objections are to be met with before his conclusions can be accepted as proved :—

1. The age of Kaniṣka is not yet settled, the probable limits of his reign being from the first century B. C. to the second century A. D.² Moreover in the Buddhist *Tripitaka* referred to, the name of Caraka is simply mentioned as the Court Physician of the King Kaniṣka but there is nothing to identify him with the author of the book. The same name, found in different places, does by no means signify the same person.

2. The time assigned to Caraka by the Indian medical tradition is of great antiquity. With regard to the chronological position of the three old authors, he is mentioned as anterior to Suśrata and Vāgbhaṭa I.³

3. Dr. Rāy has pointed out that the name Caraka is patronymic in the Veda.⁴ It is quite possible that a much

¹ See Journal Asiatique—July to December 1896, p. 444 to 484 and January to June 1897, p. 5 to 42; also Indian Antiquary Vol. XXXII, 1903, p. 382 and Vienna Oriental Journal, Vol. XI., p. 164.

² See V. A. Smith's Early History of India, P. 225-26.

Dr. Fleet in J. R. A. S., 1906, P. 979.

Dr. Bhandarkar in J. R. A. S. (Bombay Branch), Vol. XX, P. 269, J. A. S. B. Vol. XXXIX, 1870, p. 65 and 126.

१ चरकः सुनुतयेव वाग्भट्टच तथापरः ।
मुख्याच च महिता वाचाक्षिप्त एव सुने युगे ॥
अतः कृतयुगे वैद्यी वापरे सुनुती भवः ।
कली वाग्भट्टनामा च गरिमाच प्रदण्णते ।

Hārita Saṃhitā, Parīkṣādhāya.

⁴ Dr. P. C. Rāy's History of Hindu Chemistry, Introduction, P. X.

later namesake of his, is referred to by the *Tripitaka*, just as we know that more than one Vāgbhaṭa appeared as successful physician. Again we have evidence that eminent physicians in later times were called Caraka by way of a compliment and so Vāgbhaṭa was called Caraka of Sindh or Sindhicara.

4. Pāṇini wrote special Sūtras for the Agniveśas and the Carakas.¹ These names must have been famous before Pāṇini's time, otherwise he would not have written special Sūtras for them. Prof. Goldstucker has conclusively proved that Pāṇini could not have flourished later than the sixth century B. C.²

5. Patañjali wrote a commentary on Caraka.³ He flourished during the second century B. C. Both Čakrapāṇidatta and Bhoja allude to him as the redactor of Caraka Saṁhitā.⁴ So Caraka must have flourished long before him, for unless his work was regarded as a standard work of authority, Patañjali would not have taken so much pains to write notes on the book, and still more for issuing a redaction.

6. The internal evidence of the book itself speaks against such an assumption. There is no salutation to any deity at the

¹ कटचरकासूक्त । Pāṇini 4. 3. 107.

गग्नीदिव्यो यथ ॥ Ibid, 4. 1. 105.

गग्ने । वत्स ! * * * * अधिवेश * * * * पराप्रार । अतुक्षें । * * * .

* Goldstucker's Pāṇini; and Journal of the Asiatic Society of Bengal, Vol. XLII, P. 254.

³ आमोनमि अनुभवेन वन्मृतवस्त्र काम्चेन लिथयवान्, रामादिवकादपि नाथवाचादी
यः स इति चरके पतडलिः ।

Quoted in Laghumañjuṣṭ of Nāgeśa Bhaṭṭa (Rāy).

⁴ पातञ्जल—महाभाष्य—चरकपतिमेष्टते ।

मर्मीवाक्-कावदीषावाम् इत्येहिपतये नमः ॥

Fide salutation in the Āyurvedārthadipika.

beginning of the book,—a custom invariably found to be observed in the more modern compilations. There is complete absence of Paurāṇic theology in the Caraka Saṁhitā, nor is there any reference to Śākyā Muni and his religion. Kaniṣka was a great patron of Buddhism, and it might naturally be expected from the Court Physician of the king to describe the charitable hospitals which we know from the edict of Aśoka, to have flourished in every quarter of India. On the contrary we find descriptions of a hospital as reserved for rich men only at their own houses. Those gods and goddesses that figure so prominently in the Purāṇas were unknown during his time.¹ Beef was not then, apparently, a

¹ No doubt the names of Lakṣmi, Kṛṣṇa and Vāsudeva occur in Cikitsita Sthānam, Chapter XXV, but it should be remembered that they occur in the Supplement added by Dr̥ḍhavala in later times.

सर्वविद्या न तत्र प्रभवनि न चाग्रिश्वरपूर्णीः ।
महामीथ तत्र भजते यत्र महागम्भेष्टस्यस्ति ॥
पितॄमात्र इमत्तात् भिर्द्दु भलमृदीरवैत् ॥
सम भाता जया नाम विजयी नाम मे पिता ॥
सोऽहं जयो जयापुर्वो विजयी इय जयामि च ।
नमः पुरुषसिंहाय विजये विश्वकर्मणे ॥
सनातनाय लक्ष्माय भवाय विभवाय च ।
तेजो इवाक्ये: साक्षात् तेजो ब्रह्मन्दर्शीव्यसे ॥
यशाहं नाभिजानामि वासुदेवपराजयम् ।

Caraka Saṁhitā, VI, xxv.

But Kṛṣṇa and Vāsudeva are mentioned in Pāṇini as demigods, having many adherents who formed a class. “वासुदेवार्जुनाम्भौ तुन्” Pāṇini, 4. 3. 98. Again the passage may be an interpolation of a subsequent Vaigñaka Paid.

So Br̥ahvadhvaja is also mentioned in Dr̥ḍhavala's Supplement, as a god to be worshipped during the preparation of some medicines :

ब्रह्मवीष्टपटहमेतैविनादे: भिर्द्दु भिर्द्दक्षत्तच्छाये गत्तक्षत्तमारीपयैत्तमवन
इवज्ञमनिपूजा तं चेह विभागमाचिकमहत्ताजीः स्तुतिदेवता इन्द्रं किं गमयेत् ॥

Ibid. VIII, xi.

forbidden food, for it is spoken of as an article of diet that should not be indulged daily,¹ nor should it be used in excessive quantity as it is mentioned as a cause of the disease, Vāta-Rakta.²

The style of the book is antiquated and decidedly savours that of the Brāhmaṇas. Nāya and Vaiśeṣiki systems occur in the text,³ and so probably the book was written long before the compilation of these Sūtras.

Editions.—The book had undergone several editions. It was edited by Jibānanda Vidyāsāgar, Calcutta, in 1877 and 1896 (2nd Ed.) ; by Gaṅgādhar Kaviratna, Berhampur, 1879 ; by Gupta, Calcutta, 1897 ; with commentary by Cakrapāṇidatta, Calcutta, 1892-93 ; by Jaśodānandana Sarkār, with Bengali translation, 1894.

Translations.—It had been translated into English by A. C. Kaviratna, Calcutta, 1897. Caraka was translated from Sanskrit

And we find that the antidote to poison called महागच्छसौ is said to have been told by Tryambaka (Śiva) to Bajāravaya (Kuvera):

अगदीत्ये वैश्वदेवाद्यातन्त्रमिक्षय पट्टाङ्गः ।

Caraka Saṃhitā, VI. xxv.

Also we find the name of Karttikeya mentioned in Sec. IV. ch. viii.

प्रसुध लभिक्षिद्भविक्षिद्वा युभानने,

कार्त्तिक्यद्युति पुर्वं कार्त्तिकेयाभिरचितमिति ॥

१ कुर्विक्षिक्षय किलादीय शौकरं गत्यसामिषं ।

महान् दधि च मातापि यावकाय न शौकर्येत् ॥

Ibid., I. v.

२ कुललमापनिश्चावशाकादिपत्तिं चुभिः ।

द ध्यारनालम्बं वैरग्यकृतकसुरासैः ॥

Ibid., VI. xxix.

¹ Vide Caraka, III. viii.

into Arabic in the beginning of the eighth century and his name "Sharaka Indianus" occurs in the Latin translations of Avicenna, Rhazes and Serapion. "A translation of the Karaka¹ from Sanskrit into Persian and from Persian into Arabic is mentioned in the Führst, (Finished 987 A.D.). It is likewise mentioned by Albérūni²; the translation is said to have been made for the Barmekides."³ Albérūni's chief source on Medicine was "Caraka, in the Arabic Edition of Ali Ibn Zain, from Trabaristan."⁴

Commentaries.—

1. Patañjali—2nd century B.C.—not available.
2. Cakrapāṇidatta's Caraka Tātparya Tīkā, or Āyurveda-dipikā⁵—1060 A.D.
3. Haricandra⁶—1111 A.D.—not available.
4. Śibadūsa's Caraka-Tattva-Pradipikā.
5. Gaṅgūdhar's Jalpa-Kalpa-Taru—1879 A.D.

¹ Proceedings of the As. Soc., Bengal, 1870, September.

² Reinaud, *Mémoire sur l'Inde*, P. 316.

³ Maxmuller's Science of Language, Vol. I., P. 168, Foot Note.

⁴ Sachau's preface to India, P. XL.

⁵ See Caraka Saṃhitā with Cakrapāṇidatta's Commentary by Karirūja Harināth Viśārada, Calcutta, 1895.

⁶ A Commentary written by Haricandra is referred to in the Sanskrit Ślokas narrating the genealogy of Maheśvara, the author of Viśvapeukāśa and Sāhasāhkacarita, who flourished during the reign of Sāhasāṅka, king of Gazipur in 1033 Saka (1111 A. D. Wilson).

श्रीसाहसाङ्गपतेरणवद्यविद्-

वैदीशरत्र पदपहतिमेव विमत् ।

यशन्दचाक्षरितो हरिचन्द्रनामा

स्त्राण्ड्या चरकात्ममत्तेचकार ॥

SUŚRUTA SAMĀHITĀ.

The next treatise on Hindu Medicine is the Suśruta Saṁhitā. Suśruta was the son of the sage Viśvāmitra,¹ a contemporary of Rāma. He learned the Science of Medicine from Divodāsa, surnamed Dhanvantari, king of Benares, at his Himalayan retreat. According to Suśruta, Divodāsa was the incarnation of Dhanvantari, the celebrated physician of the gods in heaven, and he first propounded the Art of Healing in this world.² Suśruta represented the Surgical School while Caraka was pre-eminently a Physician in practice.

As regards the authorship of the book, opinions differ. To Suśrata, Dhanyantari addressed his lectures on Major Surgery,³

Mahābhārata, Anuśāsana Parva, Ch. 139, Vs. 8-11.

धन्तरिध्यमानतां वरिही वामिशारदः ।

विष्वासिवामनसविं शिष्यं सुयुतमक्षग्रान् ॥

Suśruta Saṃhitā, V. ii.

‘आद्यवेदविद् दिवोदास’ महामति ।

किंवद्गाम्य विसुद्धे हैं सद्भावाद्भिर्बोदधि ।

विष्णुमित्रतः श्रीमान् सुश्रुतः परिपूर्वति ।

Ibid., VI. lxvi.

महाराष्ट्राची तसेच कापीडिंगी बदारची; ।

३४२ श्रीआस्ति ग्रामाभाष्य शिवं काश्चिपतिमुनिः ॥

Ibid. VI. xxviii.

² अब खलु भगवन्ममरवरसविगचपरिहतमाद्यनस्य काशिराजे दिवीदासं धन्तरि-
सोपस्त्रिवैतरणीरमपोव्यालावतकरवीर्यमीपुररचितसुशुतप्रभवतय केतुः। Ibid, I. i.

३ अब क्यै किमुच्यताभिति । त त्रिचुः । अस्माकं सर्वेषामेव ज्ञानमूले
व्यतीपदिग्नतु भगवानिति । स त्रिवाचेवमन्तिः । अस्माकमेकमतीना मतमभिसोद्द्य
सत्यतो भगवन् प्रज्ञयति ।

which he reproduced in this work. But in the opening lines of the book, salutation is offered to Brahmā, Dakṣa, Aśvins, Indra, Dhanvantari, Suśruta and others.¹ This shows that Suśruta can not be the author of the work or at least of the work in its present shape, for no author can offer salutation to himself. By "the others" are no doubt meant the notable surgeons who practised and taught the Science of Surgery and who were either contemporary with or posterior to Suśruta. Possibly the original Suśruta Saṃhitā had been recast and the redactor could appropriately offer a salutation to the original author and to other surgeons who flourished before him. There is also an Indian medical tradition, noted in Dallayačārya's Commentary, which assigns the improved and supplemented edition of Suśruta's original work to Nāgārjuna,² the celebrated Buddhist Chemist, who is said to have been a contemporary of the king Satvāhana.³

In the third chapter, Suśruta enumerates the subjects described by him,—the chapter forming an index of the book. Therein he mentions the five principal divisions of his book and says that the Uttara Tantra or the Supplement would be

¹ नमो ब्रह्मप्राप्त्येवकलभिहृनवन्विशुश्रुतप्रसिद्धः ।

Suśruta Saṃhitā, I.

² यत यदं परीक्षे नियोगस्तवं तदैव प्रतिसंकर्त्तुं भूवं चारत्यभिति । प्रतिसंकर्त्तुं दीक्षा नामाच्छूभ्यं एव ।

Dallaya's Commentary to Suśruta, I. i.

See also Dr. Cordier's Recentes Découvertes, pp. 12-13.

³ See Harṣacarita by Vāgā.

Beal's *Buddhist Records of the Western World*, Vol II., P. 209, 212, 216.

Burgess' Archaeological Survey of S. India,

Introd. à l'histoire du Bush. Ind., P. 368.

described afterwards.¹ Now the fact that the sixth part was appended to the work as a Supplement or Uttara Tantra (*i.e.*, after treatise) clearly shows that it was written afterwards by another surgeon and added to the original treatise. If the original Suśruta wished to have six divisions of his book, he would have mentioned it clearly in the index and would not have, after stating that his book consisted of five parts, added that "the Supplement would be described afterwards,"² which seems to be an interpolation of the Supplementor to pass his edition as the orginal work of the author. Again at the end of the fifth section, there is a passage describing the importance of the Āyurveda, which was meant as the conclusion of the book by the author.³ It is to be noted

¹ प्रागाभिहिते सविशेषायगतं पञ्चमु स्थानेषु । तत्र मूलस्थानमध्यया: षट्कलारित्वं ।
षट्कलानिदानानि । दश शारीराचिः । चत्वारिंशचिकित्सितानि । छट्ठी कल्पाः । तदुपर
षट्कलादिः ।

अथाधानो अत विश्वमेवमेतदुदीरितम् ।

अतःपरं स्वनाम्बवं तत्त्वसुचरमुच्यते ॥

Suśruta Samhitā, I. iii.

² वीजं चिकित्सितमैतत् समाप्तेन प्रकीर्तितम् ।

सविशेषायगतमस्तु आख्या भविष्यति ॥

तत्र सविशेषायगतं पञ्चमु स्थानेषु । तत्र मूलस्थाननिदानशारीरचिकित्सितकल्पे-
षद्वशात् सविशेषायगतं तत्त्वं शेषानयोन् आख्यायासामः ।

Ibid, I. i.

³ सविशेषायगतमेतदुक्तं विभागः ।

षट्कलानिदानिदानसंबोधनं वलामधीतरे ॥

सनातनलव्होदानामचरत्वात्पद्मवं ॥

तथा इष्टकलत्वाच इतत्वादपि देहिनो ।

वाक्समृहार्दिविभारात् पूजितलाच देहिभिः ॥

चिकित्सितात्पृष्ठतमं न किञ्चिदपि स्फुत ।

क्षापरिन्द्रप्रभायमाचत्वाचिरिवगुरोः ॥

धारयित्वा तु विमर्शं मतम् परमसम्प्रते ।

उक्ताहारं समाचारद्वैह प्रेत्य च मीदते ॥

Ibid, V. viii.

that at the end of no other sections do we find a similar passage. He also writes: "Thus one hundred and twenty chapters are described" but adds: "The other diseases shall be described in the *Uttara Tantra*": the latter part no doubt is an interpolation of the Supplementor. Moreover, in the opening lines which serve as a preface to the sixth part, the authority quoted for the diseases of the eye is Nimi, the king Janaka of Mithilā and not Dhanvantari.¹ But in the first chapter of the first section, it is described that the sages wanted Dhanvantari to teach them Śalyatantra or Major Surgery only and he consented to their request. And this subject he treated in detail in the five sections of the book. In the Supplement, on the other hand, are described the other branches of the science such as Minor Surgery, Inner Medicine, &c. Probably this part was added afterwards to give completeness to the treatise; and the original Suśruta was called *Vṛddhya* or the Old by the commentators to distinguish him from the Supplementor.

Suśruta's work is specially important to us as having two whole chapters (vii and viii of Section I.) devoted to the descriptions of Surgical Instruments and one whole chapter (xxv of Section I.) to the principles of Surgical Operations.

The age of Suśruta is also involved in obscurity. Nothing can be ascertained from the fact that he was a son of Viśvāmitra²,

¹ श्लायानां गते विरुद्धं बद्धमस्त्रव्याया ।
वल्यामि वडधा मत्यनुपर्दयां जिमानिति ॥
इदानीन्त प्रवल्यामि तज्जुत्तरमुत्तम् ।
निखिलेनीपदिष्टने यद रीगः पृथ्विभः ॥
आलाक्षशास्त्राभिहिता विदेहाधिपक्षितः ॥

Suśruta Saṃhitā, VI. L

² Viśvāmitra is the *gotra* name; so the simple name may either refer to the great Viśvāmitra or to his descendants.

for the age in which the latter lived is not known to us. But he must have flourished during the Vedic Age as many Vedic Hymns are ascribed to him. In the *Mahābhārata*, Suśruta is mentioned as one of the sons of Viśvāmitra¹ and in the *Suśruta Saṃhitā* the author is often described as his son. The age of the great epic has, with good reasons, been fixed at 1000 B.C. So Suśruta must have flourished much earlier. The latest limit which we can assign to Suśruta is 600 B.C. as "there are indications in the *Śatapatha Brāhmaṇa*, a secondary Vedic work, that the author of it was acquainted with the doctrines of Suśruta" as regards the Osteology. "The exact date of that work is not known, but it is with good reason referred to the sixth century B.C." Again in the *Atharva Veda*, in the tenth book, there is a hymn on the creation of man in which the skeleton is described according to Ātreya and Suśruta.² "The large portion of it (Books I to XVIII) indeed admittedly belongs to a much earlier period, possibly as early as about 1000 B.C.; and the hymn in question is included in this older portion". This shows that Suśruta could not have flourished later than 1000 B.C.

Again in *Hasti-Āyurveda*, a book on the Treatment of

¹ विश्वामित्रोऽयं गार्यते जापति सुश्रुतस्तथा—

* * * * *

विश्वामित्राद्वाजाः सर्वे मुनयो इष्टवादिनः ॥

Mahābhārata, Anuśāsana Parva, Ch. IV.

* See J. R. A. S., 1906, P. 915; 1907, P. 1.

* Hoernle's Studies in the Medicine of Ancient India, Part I. Osteology, Introduction, P. 9.

Elephants by Pālakāpya, we find the Surgical instruments described after the manner of Suśruta. Pālakāpya lived as a Veterinary Surgeon in the Court of Romapāda, King of Aṅga, which had as its capital the famous town of Cāmpā, identified with the modern town of Bhāgalpur. King Romapāda was contemporary with king Daśaratha, the father of Rāma, the hero of Rāmāyana.¹ Here we have a corroborative evidence of the age of Suśruta.

Suśruta is mentioned in the *Vārttikas* of Kātyāyana² who flourished during the fourth century B.C.

We have alluded to Nāgārjūna,³ the Buddhist Chemist, as the redactor of the Suśruta Saṃhitā. He is said to have been a contemporary of king Kaniṣka that is about the first century B.C.

Another revision was undertaken by Candrade, the son of Tisāṭa, the author of Cikitsā-kalikā. He revised the text which must have fallen then into a state of corruption. The probable date of Candrade is the ninth century A.D.⁴

¹ अथि सुश्रवसामाण्डा पितरं च वशस्तिवन् ।

एतद्विषेदकाले तु रोमपाद प्रतापवान् ।

Rāmāyana, Valakandam, Ch. IX.

See also Rāmāyana, i, 11, 13-20; Mahābhārat, iii, 110, 10008-9; Bhāgavat, ix, 2.1, 7-10.

² सुश्रवेश व्रीजे मौगुरे ।

³ Possibly more than one Nāgārjūna appeared in ancient India as a chemist. Albérini says: "He lived nearly a hundred years before our time" (India, I. P. 189). Rājtarāṅgini places him in the 3rd century B.C. (I. Vs. 172-173). The modern scholars are of opinion that the founder of the Māhāyāna system lived in the first century A.D.

* Hoernle's Osteology, p. 100.

There is no doubt of the tradition that Suśruta's work was redacted, for the author could not write such a passage as follows: "The surgical treatises of Aupadhenava, Aurabhra, Suśruta and Pouṣkalāvata from the basis of other treatises on the subject."¹

*Commentators.*²—

1. Cakrapāṇidatta—Vānumati—1060 A.D.
2. Gayadāsa—{Nyāya Candrikā or Pañjikā}—11th century A.D.
3. Jejjatācāryya.
4. Bhāskara.
5. Mādhnava.
6. Bramhadēva.
7. Dallānācāryya—Nibandha Saṅgraha—12th century A.D.
8. Ubhalta (Kashmir).

Editions.—Suśruta Saṁhitā has been edited by Madhusūdana Gupta, Calcutta, 1835; by J. Vidyāsāgar, 3rd Edition, Calcutta, 1889; by A. C. Kaviratna, Calcutta, 1888-95; by Prabhurām Jibananārājan, Bombay, 1901; and by Virasvāmī, Madras.

This book has been translated into English in part only by U. C. Datta 1883, A. Chat̄opādhyāy 1891, Hoernle 1897, Calcutta, in the *Bibliotheca Indica*. It has been translated into Latin by Hessler and into German by Vullurs.

The book was translated into Arabic before the end of the eighth century A.D. It is called "Kitab-Shawshon-al-Hindi"

१ श्रीपदिनवन्मोर्खं सौमुतं पीष्कचावतम् ।

ग्रेषाचां ग्रल्यतन्वाचां मूलार्थैतानि निहितेत् ॥

Suśruta Saṁhitā, I. iv.

* श्रीसहनपालदेवनपतिवल्लभः श्रीडङ्गचः समभृत् । तेन
श्रीजैनमृष्टं द्वीकाकारं श्रीगयदासभास्तरौ च पञ्चिकाकारौ श्रीमाधवद्वा-
देवादीन् द्वीपनककारौ श्रीपत्रीब्यापुब्बेदग्रामं सुखुतव्याक्षानाय निष्पत्त्येष्वः किमते ।

Dallapa's Commentary, I. i.

and also mentioned as "Kitab-i-Susrud" or Book Suśrata by Ibn Abillsaibial. Rhazes often quotes Sarad as an authority in Surgery.¹

VĀGBHATA I.

The next author of celebrity and whose work is still extant is Vāgbhaṭa I or Vāgbhaṭa the elder, the author of Aṣṭāṅga Saṅgraha (i.e., Compilation of the Octopartrite Science). In later times, a namesake of his, wrote another work called Aṣṭāṅga Hṛdaya Saṃhitā (or the best Compendium i.e., the Heart of the Octopartrite Science). In the Uttara Sthāna, Vāgbhaṭa the younger distinctly states that his Compendium is based on the Compilation of Vāgbhaṭa the elder.²

As regards the age of Vāgbhaṭa the elder, there is the same uncertainty as with his predecessors. We are however sure that he is posterior to Caraka and Suśrata for he refers to these writers by name.³

The chronological relation of the three early authors is described in a popular couplet that Ātreya, Suśrata and Vāgbhaṭa were the three great medical authors for the three Yugas—

¹ "His next description is from an author named Sarad, whom he frequently quotes in other parts of his works".

Adam's Commentary on Paulus Aeginetta, VI. lxi.

² चटार्हवेयकमहीदधिसन्देश वीरेन्द्रावसंग्रहमहायतरात्रिरात् ।

तस्मादनवफलमन्तस्मुद्यमात्रा प्रोत्यर्थंभेतदुदितं पृथगेव तन्म ॥

Aṣṭāṅga Hṛdaya Saṃhitā, Uttara Sthāna, Ch. XL, v. 82.

³ By name, e.g. in Saṅgraha, Bombay ed., Vol. I, P. 246; Vol. II, P. 421. Again quoted from Caraka, *Ibid.*, Vol. I, pp. 90, 93; Vol. II, pp. 212, 213, *et passim*; from Suśrata I, *ibid.*, Vol. I, pp. 109, 121, 177, 247; Vol. II, p. 303, *et passim*. (Hoernle).

the Tretā, Dvāpara and Kali, respectively.¹ They are known as the Vṛddha Trayī or the Old Triad. This medical tradition goes much against the conclusion of Dr. Hoernle that Vāgbhaṭa I must have flourished early in the seventh century A.D. One of the reasons put forward by him is the fact, that "the Buddhist pilgrim ITsing, who resided ten years in the Nalanda University (in Bihar) from about 675-686 A.D., states in *Records of Buddhist practices* that the eight arts (i.e., the branches of medicine) formerly existed in eight books but lately a man epitomised them and made them on one bundle (or book)."² Professor Jolly understands by it the Suśruta Saṃhitā while Dr. Hoernle points out with more reasons that it refers to Vāgbhaṭa I's work, the Aṣṭāṅga Saṅgraha (i.e., the Compilation of the Octopartrite Science) and rules out Suśruta by the word "lately."³ But the description that ITsing gives of the contents of the book does not warrant any reference to either. Moreover, he has not given any reason why Vāgbhaṭa II's book Aṣṭāṅga Hṛdaya Saṃhitā (the best Compendium of the Octopartrite Science) might not be alluded to by ITsing. Dr. Hoernle, however, rules him out by date for "he can not be placed earlier than the eighth century"—an assertion unsupported by any evidence whatsoever. All that he has proved is that "Accordingly it is probable that all these three medical writers (Mādhyava, Dr̥gjhātaka and Vāgbhaṭa II) come in the period from the 7th to the

¹ See foot-note 3, P. 6.

² ITsing: *Records of the Buddhist Religion*. Transl. by Professor Takakusu, P. 128.

³ J. R. A. S., 1907, P. 413.

Hoernle's *Osteology*, Introduction, P. 10—11.

9th century A.D.¹ at no very great interval from one another," and this proof is based on the age of Vāgbhaṭa I as suggested by I'Tsing's remarks. Thus he has taken for granted what he is required to prove. He has shown that Suśrata is anterior to Vāgbhaṭa I; and Vāgbhaṭa II is posterior to him. But in trying to prove that Vāgbhaṭa I lived in the seventh century he cannot assume that Vāgbhaṭa II lived in the eighth. Another evidence adduced in support of his conclusion is the fact that the non-medical version of the list of bones of the human body as contained in the Law-book of Yājñavalkya presupposes earlier uncorrupted forms of lists of bones both in Caraka and Suśrata, and "the corrupt recension, traditionally handed down, must have come into existence at a later date," that is to say, between the date of Yājñavalkya (350 A.D.) and Vāgbhaṭa I, the latter of whom is proved to have copied from the corrupt recensions of Caraka and Suśruta. Thus the older recensions still existed in the fourth century A.D. and if we add to it the interval of time necessary for the texts to have fallen into a state of corruption, we get the early seventh century A.D. for Vāgbhaṭa I. But we must remember that there is nothing to prevent against the supposition that Vāgbhaṭa I lived before Yājñavalkya. There might have been two recensions of the texts available during Yājñavalkya's time, one corrupted and it might or might not have been the work of Vāgbhaṭa I and another true version which was availed of by the sage Yājñavalkya. And similar events have happened, as has been pointed out by Dr. Hoernle himself, in our own generation. Gaṅgādhar's recension of Caraka is a corrupted form of the text,

while the recension given in Jībānanda's edition is the traditional text of Caraka. No critic would I think jump into the conclusion that Gaṅgādhar lived three or four centuries after Jībānanda. Again if it be true, as he contends, that Suśruta was redacted by Vāgbhaṭa I, we could easily imagine that Yājñavalkya copied his list bones from the original Suśruta and not from the redaction of Vāgbhaṭa I. So we see that the age assigned to Vāgbhaṭa I, or the seventh century A.D. can not be accepted as proved. Dr. Hoernle says : "It should, however, be understood that these conclusions regarding the date and authorship of Vāgbhaṭa I, are not put forward as established fact."

Let us recapitulate the objections that can be urged against the conclusion that Vāgbhaṭa I lived in the seventh century A.D.

1. Vāgbhaṭa I is believed by the Indian medical men to have flourished long before the Christian era. By some, he is connected with the court of Yudhiṣṭhīra, but his name is nowhere mentioned in the Mahābhārata. Ātreya, Suśruta and Vāgbhaṭa are described as the Old Triad or Vṛddhya Trayī and they were the authorities for the Tretā, Dvāpara and Kali Yugas, respectively. It is curious to observe that Dr. Hoernle in arguing against the conclusion of Prof. Jolly that Suśruta is meant by ITsing, takes advantage of this Indian medical tradition that Suśruta flourished during pre-historic times, but does not mention the same tradition with regard to Vāgbhaṭa I, which goes against his own conclusion. On the other hand the same objection does not apply against Vāgbhaṭa II.

2. The name of Vāgbhaṭa. Its book, Compendium of the

Octopartrite Science, no doubt, agrees very well with the description of ITsing that "lately a man collected them into one bundle." But Vāgbhaṭa II's book "The best Compendium of the Octopartrite Science" is equally suggestive, though Dr. Hoernle says: "it cannot prevail by the side of the more suggestive name of the rival work of Vāgbhaṭa the elder."

3. Again in arguing against Prof. Jolly, Dr. Hoernle has attached much importance to the word "lately" by which Suśruta is ruled out by date. Admitting the validity of such reasoning, it does not follow that by the word "lately" ITsing meant any contemporary author or any one who preceded him by a short period only. To comprehend the meaning of the sentence we must understand the word "lately" in connection with the word "formerly" used before.¹ Now the sentence "The science of medicine formerly existed in eight books" no doubt refers to the division of Āyurveda into eight parts by Brahmā and to the treatises on the different branches of Medicine by Agniveśa, Suśruta and others. These treatises are believed to be of remote antiquity, and so any later compilation may be spoken of as recent in comparison with the old treatises of unknown ages. Thus the word "lately" may refer either to Vāgbhaṭa I or Vāgbhaṭa II, but the latter author's claim to the honour becomes reasonable considering his decided posteriority to the former and so coming within the limit of the time suggested by the word "lately."

4. Again ITsing refers to a book which was recognised as the standard throughout India. This may refer either to

¹ J. R. A. S. 1907. P. 174.

Vāgbhaṭa I or II. But if Vāgbhaṭa I's book occupied such a position at the time of ITsing, it becomes difficult to imagine why Vāgbhaṭa II should write another work principally based on the work of Vāgbhaṭa I after a lapse of a century or so. Moreover, we find at the present time, that Vāgbhaṭa II's book, Aṣṭāṅga Hṛdaya Saṁhitā, has a wider popularity than the book Aṣṭāṅga Saṅgraha of Vāgbhaṭa I. The former has been printed many times and is widely read by the students,—so much so Vāgbhaṭa is generally known as the author of Aṣṭāṅga Hṛdaya Saṁhitā.

5. Moreover, the Arabian physician Rhazes, who is said to have lived in the ninth century (882 A.D.) in treating of the property of ginger, the common plantain or musa and other drugs, quotes from an Indian writer, whom he calls Sindaxar or Sindicara.¹ Royle says: "But in the article De Allio another Indian author is quoted, whom I have not been able yet to trace out—*Ait Sindifar* (in another place written "*Dixit sindicar'*) *indianus valet contra Ventositatem.*" This Sindicara is identified with Vāgbhaṭa II of Sindh who was in his time known as a second Caraka or Cara, the syllable "ka" making no difference, as in words like "bāla" and "bālaka," both meaning a child.² We know that the Vāgbhaṭa's Aṣṭāṅga Hṛdaya Saṁhitā was one of the medical works translated by the order of Caliphs in the eighth century.³

6. The translations of the Caraka, the Suśruta and the Vāgbhaṭa occur in the Thibetan Tanjur.⁴ "George Huth,⁵

¹ Antiquity of Hindu Medicine, Page 38.

² History of Aryan Medical Science, P. 196.

³ Zeit. deut. morg. Ges. 34, p. 465.

⁴ Jour. Asiatic Soc. XXXVIII. (1835).

⁵ Zeit. deut. morg. Ges. T. (LXIX. pp. 270—284).

who has recently critically examined the contents of the Tanjur, concludes that the most recent date at which it can be placed is the 8th century A.D."¹

So I cannot avoid the conclusion that of the three authors, Suśruta, Vāgbhaṭa I and II, to which ITsing's remarks may refer, the last has probably the best claims to that reference; and the date assigned to Vāgbhaṭa I may well suit Vāgbhaṭa II i.e., "as late as the early 7th century A.D."² and possibly still earlier.³ Again it is impossible for us to say whether ITsing's remarks may not appropriately refer to other authors whose works are lost to us.

Mention should also be made of the fact pointed out by Dr. Cordier that Vāgbhaṭa is mentioned in Rājtarāṅgiṇī and his date is fixed there as 1196-1218 A.D.⁴

But the name of Vāgbhaṭa does not occur in Stein's edition of Rāj, which is no doubt the most reliable, and so we can easily dismiss this view as untenable.

Editions.—Vāgbhaṭa I's book *Aṣṭāṅga Saṅgraha* has been printed in Bombay.

Commentary.—Aruṇadatta—about 1220 A.D.

¹ P. C. Ray's History of Hindu Chemistry, Intro., P. XXIX.

² Hoernle's Osteology, Intro., p. 10.

³ Dr. Kunte places him "at least as early as the second century before Christ," Vide his Intro. to Vāgbhaṭa's *Aṣṭāṅga Hṛdaya Saṅhitā*.

⁴ सिंहग्रस्तः परमवौदी वाग्भटाचार्यः काम्भीरनवरपति जयसिंहस्य इत्रापाद्यन् समदे (ख: शादज शताब्द्याम्, शक ११८—४०) वर्तमाना चासीत् :

Quoted in Cordier's *Vāgbhaṭa et l'Aṣṭāṅga-Hṛdaya Saṅhitā*, 1896.

See Intro. to the *Vaidyakālambanśidhi* by *Kacirāja Umeśandra Gupta*, 1894.

VĀGBHĀTA II.

The next great authority in Hindu medicine is Vāgbhaṭa II, son of Sirīha Gupta, an inhabitant of Sindh.¹ His work, Aṣṭāṅga Hṛdaya Saṁhitā, the author himself states, is based on the summary of Vāgbhaṭa the elder.² In the first chapter of Sūtra Sthāna, he acknowledges the help he received from the works of Agniveśa, Hārīta, Bhela, and others.³ The fact that Caraka is not referred to here as one of the sources of Vāgbhaṭa II has been taken advantage of by some to prove the posteriority of Caraka.⁴ They conclude that Agniveśa and Suśruta wrote their works long before him, and the Agniveśa Tantra was not called by the name of, and in fact was not as yet edited by, Caraka, at the

१ भिषग्वरी नामट इत्यभुवने
पितामहो नामधरोऽस्मि वस्त्र
सुतोऽमवतस्य च हिंहगुप्तः
तत्पात्रवहम् सिन्धुस जातजन्मा ॥

Aṣṭāṅga.

¹ Aṣṭāṅga Hṛdaya Saṁhitā, Uttara Sthāna, Ch. XL, v. 82.

See foot note 2, p. 18.

२ ब्रह्मा स्मृताऽऽयुष्टी वेदं प्रत्यापतिमज्जियहत् ।
सौऽश्विनौ तौ सहस्राच्च सौऽचिपुत्रादिकाम्नौन् ॥४॥
तेऽधिवेशादिकाणि तु पृथक् तत्त्वाणि नेनिरे ।
तेभ्योऽतिविप्रकीर्णम्यः प्रायः सारतरीबयः ।
क्रियतेऽदाहुष्टदयं नातिसंकेषणिकरम् ॥५॥

Aṣṭāṅga Hṛdaya, Sūtra Sthāna, Ch. I.

¹ "It would appear also that at the time Vāgbhaṭa lived, Agniveśa's work was not called by the name of Caraka, and Suśruta had also been written. Hence it follows that Caraka's edition of Agniveśa, that is the work now called Caraka, was probably edited after Suśruta had been written."⁵

Dutt's Materia Medica of the Hindus, Intro., p. LX.

time Vāgbhaṭa II flourished. The argument is however not conclusive ; it only shows that the Agniveśa Tantra was available to Vāgbhaṭa II in its original form. No definite results can be expected from this *argumentum ex silentio*. Again it may easily be imagined, and I think it is the right view of the question, that Caraka lived and edited Agniveśa's work long before Vāgbhaṭa, the reason of Caraka being not mentioned in Vāgbhaṭa's book, is the fact that Caraka did not usurp the authorship of Agniveśa Tantra but clearly states at the end of each chapter the real nature of his share in the authorship of his book in the following words :—“Here ends the chapter of Agniveśa Tantra as corrected and edited by Caraka.” Many modern text books of medicine have been edited and improved, though the books are still called after the original authors. Moreover to make Caraka flourish after Vāgbhaṭa II would bring him to quite modern times.

We are however arguing on false premises. Though Caraka is not mentioned in the Sūtra Sthāna of Aṣṭāṅga Hṛdaya, his name occurs in the Uttara Sthāna.¹ So there can be no doubt that Caraka's edition of Agniveśa was current in India long before Vāgbhaṭa II wrote his Aṣṭāṅga Hṛdaya Saṃhitā.

¹ यदि चरकस्थीते तदभ्युवृ सुनुतादि
प्रणिगदितगदानां नामसावेऽपि वाचः ।
अथ चरकविहीनः प्रक्रियासमिद्भिरः
किमिह स्वनु करोतु अधितानां वराकः ॥४६॥
* * * * *
चरप्रस्थीते प्रोतिषेभ्युक्ता चरकसुनुती ।
भेदाद्याः किं न पञ्चान्ते तस्मात् त्र्यु सुभाषितम् ॥५१॥

Aṣṭāṅga Hṛdaya Saṃhitā, (Ed. Vijayratna Sen),
Uttara Sthāna, Ch. XL.

Editions.—There are various editions of the book but the following are reliable :—

1. By Dr. Anna Moreśvara Kunte, M.D., 2 vols., Bombay, 1880 ; 2nd Ed., 1891.
2. By Jibānanda Vidyāśāgara, Calcutta, 1882.
3. By Vijayratna Sen Kaviranjana, Calcutta, 1885-90.
4. By Ganeś Sastri Tardevaidya, Bombay, 1888.
5. In Sanskrit and Bengali, with the commentary of Arūṇadatta by Vijayratna Sen Gupta, Calcutta, 1885.
6. In Sanskrit and Guzrathi by Behicharlal Nathuram, Ahmedabad, 1889.
7. In Sanskrit and Bengali by Kāliśa Cundra Sen Gupta, Calcutta, 1890-1892.
8. In Sanskrit and Hindi by Pandit Robi Dutta, Bombay, 1890. "
9. In Sanskrit and Marathi by Ganeś Kṛṣṇa Garde, Poona, 1891.
10. In Sanskrit and Bengali by *Kavirāja* Binod Lāl Sen, Calcutta, 1891-1892.

Commentaries.¹—

1. Sarvāṅga Sundari² by Arūṇadatta, son of Mṛgñākada, 1220 A.D.

¹ See Cordier's *Vāgbhaṭa et L'Aṣṭāṅgahṛdaya Saṃhitā*, P. 6.

² इति श्रीमूर्त्याहृदतपुरात् श्रीमद्वचदतपविरचितायाः
सर्वाङ्गसुन्दराम्ब्यटीकायाः * * * * .

2. Āyurvedadarśayana (Dinacharyā Prakarana) by Hemadri or Kamadeva, Raja of Devagiri. It is available in parts only.
3. Aṣṭāṅgahṛdayarddyota by Aśadhara Sallaxana.
4. Padārthacandrikā by Candracandana.
5. Saṅketamañjari by Dāmodara.
6. Aṣṭāṅga Hṛdayatikā by Rāmanāth Vaidya.
7. Vālaprobodhikā (Anonymous).
8. Hṛdayabodhikā "
9. Pāṭhya.
10. Vāgbhaṭartha Kaumudi by Hari Kṛṣṇa Sen Mullick.
11. Pradīpa by Jaśodānandan Sarkar, 1298 B.S.

VĀGBHATA III.

The author of Rasaratna Samuccaya in the Colophons at the end of each chapter identifies himself with Vāgbhaṭa II : "Here ends Book first (or so) of R.R.S. composed by Vāgbhaṭa, son of Simha Gupta, prince of physician." The salutation at the beginning of his book is strictly Buddhistic. The probable date of the book is "placed between the thirteenth and fourteenth centuries A.D."¹ "The chemical knowledge, as revealed in Vāgbhaṭa is almost on a par with that in the Suśruta," whereas the R. R. S. indicates an advanced state of that science. He quotes Rasārṇava as a source of his information ; he does not mention opium as a medicine, and the Firaṅga roga and its treatment find no place in his book.

¹ P. C. Ray's History of Hindu Chemistry, Intro., p. li.

MĀDHAVAKARA.

He is the author of the famous work on Pathology or Nidāna. His book was translated into Arabic by the order of Harun-Al-Rasid and so the most recent date that can be assigned to him is the seventh century A.D.¹ Thakore Saheb of Gondal identifies him with Mādhabacāryya, the celebrated author of Sarvadarśana Saṅgraha, the brother of Sāyana, the commentator of the Vedas.² I do not find any authority for such an assertion and here is an example of fallacious reasoning based simply on the identity of names. Mādhabacāryya and Sāyana lived in the twelfth century A.D. Mention should also be made of the view expressed by Dr. Hoernle as certain that Mādhavakara, the author of Nidāna and Vṛṇḍā Mādhava, the author of Siddhayoga are one and the same person. He holds that Vṛṇḍā is the real name, but he was known to the commentators as Mādhava, for his melodious diction. There is no proof given of this opinion, and we have reasons for not accepting it. However as he does not treat of surgical instruments, his work is not important to us.

CAKRAPĀÑIDATTA.

Cakrapāñidatta or more commonly Cakradatta in a Colophon³ has given an account of himself in his book called

¹ Jolly's Indian Medicine, ff. 5, 6, pp. 7-9.

² History of Aryan Medical Science, Ch. II, p. 35.

³ शौडाधिनाय रसवत्ताधिकारिपाद—

नारायणस्य तनयः मुनयीऽनरहात् ।

भार्णोरनु प्रशिलकीधवलीकुलीनः

शीघ्रकपालिरिह कर्तुं पदाधिकारी ॥

Colophon in Cakradatta.

Cikitsā Sāra Saṅgraha: "The author of this work is Śrī Cakrapāṇi who belongs to the family of Lodhravalī; and who is the youngest brother of Vānu and the son of Nārāyaṇa, the superintendent of the kitchen of Nayapāla,¹ the king of Gour." This book is arranged on the plan of Vṛnda in his Siddhayoga² which again follows closely as a companion volume to Mādhaba's Nidāna.³ The age of Cakradatta is about 1060 A.D.; and Vṛnda must have flourished between Mādhaba and Cakrapāṇi for he quotes the former while he is himself quoted by the latter. So the probable age of Vṛnda is the ninth century A.D. Besides being a celebrated author, Cakradatta wrote excellent commentaries of Caraka and Suśruta. His extant works are—

1. Cikitsā Sāra Saṅgraha or Cakradatta. A treatise on Medicine.

¹ For the date of Nayapāla, vide Cunningham's Archaeo. Survey of India. III. P. 119; also J. A. S. LX. Pt. I. P. 46. Life of Atisa by S. C. Das.

²

यः सिहयोगचित्तिविकासिहयीगा—

नवैव निचिपति केवलमुहरैदा ।

भृत्यविषयवेदविदा जनेन

दतः पतेत् सपदि मूर्दनि तस्य शापः ॥

Sloka at the end of the Cakradatta.

य इत्यादौ।—सिहयीग इति इन्द्रकृतसंदहस्य संज्ञा, तत्रिचित्तयोगमपेक्ष्याधिका ये च सिहयीग अत्र संयहे उक्तामानविकीर्णान् तर्वैव सिहयीमे निचिपति, सथा दी वा तानधिकसिहयीगानितः संयहादुदरैन् दूरीकृत्यात्, तस्य मूर्दनि वैद्यजेन पुंसा दतः शापः पतेत्। कौद्येन पुंसा! भृत्यविषयवेदविदा। कारिका इहटीका चन्द्रोकेति भृत्यविषयवेदः कर्म्यत्रुःसामर्थ्यः, तदिदा ॥

Sibadita Sen's Commentary.

³ हन्तेन * * * * * संचित्यते गदविनिषयकमेन ॥

2. Cakradatta or Materia Medica. It treats on drugs applicable to a number of diseases.
3. Muktābali. This treatise on the nature and properties of medicinal drugs is ascribed to Cakrapāṇi.
4. Vānumati—Commentary on Suśruta Saṃhitā.
5. Cakratattwadīpikā—Commentary on Caraka Saṃhitā.

Editions.—

1. Cakradatta or Cikitsā Sāra Saṃgraha edited by Kavirāja Pyāri Mohan Sen Gupta, Calcutta, 1295 B.S.
2. Cakradatta with Bengali translation by Candrakumār Dās Kavibhuṣan.
3. Cakradatta with Bengali translation and with commentary of Śiva Dās Sen, by Jaśodā Nandan Sarkār, 1302 B.S.

• • •
SĀRAṄGADHARA.

He wrote Sāraṅgadhara Saṃgraha. It is compiled from the works of Caraka, Suśruta, Vāgbhaṭa and others.¹ It is very popular in Western India. It treats on nosology and practice of Medicine. He was the son of Dāmodara and flourished in the fifteenth century A.D.

*Edition.—*By Kavirāja Pyāri Mohan Sen Gupta, Calcutta, 1296 B.S.

¹ प्रसिद्धयोगा मुनिभिः प्रथमा
शिक्षितस्यकै ये वहशीऽनुभूताः ।
विद्योदयते ग्राह' वरेण तेषाः
सुमंगलः सच्चन्द्रप्रभनामः ॥

Commentary.—*Sāraṅgadharatikā*: It is a commentary on the above work by Adhamulla.

BHĀVA MIŚRA.

About 350 years ago, a compilation was made by Bhāva Miśra, son of Lataka Miśra, an inhabitant of Benares, from the most celebrated medical works and was called Bhāva Prakāśa.¹ He lived about 1550 A.D. and was considered a "Jewel of Physicians and Master of Śāstras." He mentions China root called Tob Chini² in the Vernacular as a remedy of Firaṅga roga or Syphilis³ which he describes for the first time in India. He was the first to make mention of certain drugs of foreign countries as Badhkshamī Naspaśi,

¹ अयुर्वेदाभिमध्यादतिमतिसुनवी योगरवानि यदा-
लभू से से निवन्देदभुरस्तजन व्यविवधेसनाथ ।
तमह गन्धादग्नहैः सुवचनमाणभि भाँटमिदविकिळा
आक्षे जायाभकारे प्रजमधितुमिमे सविधते प्रकाशम् ॥

Bhāva Prakāśa, I. i.

इति श्रीमित्र लटकतनय श्रीमन्दित्रभावविविते
भावप्रकाशे यठ प्रकरणे सम्पूर्णे ॥

Colophon at the end of Section I.

² होपालरवचा किचितिक्षीणा वडिद्विमिहत् ।
विवम्बाधानयस्तद्वी शक्त्युचविशेषिद्वी ॥
कालव्याधीनयक्षारसुन्दारं ततुवेदनाम् ।
व्यपीडिति विशेषेण फिरामयनाशिनी ॥

Bhāva Prakāśa, I. i.

³ फिरडसंशके देशे वाहुन्येनव यडवेत् ।
तथात् फिरड इच्छुकी व्याधिश्चाचिविजारदैः ॥

Bhāva Prakāśa, II. iv.

Khorasani and Parasika Vacha (Acorus Calamus), Sulemani Khārjura (date fruit of Suleman),¹ and opium.

Editions.—

1. By Jibānanda Vidyāsāgara, Calcutta, 1875.
2. By Rasik Lāl Gupta.
3. By Kāliśa Candra Vidyāratna.

Besides these books, the number of Sanskrit medical works is simply legion; many of them are daubed with fancy names and are excellent treatises on the different branches of medical science. But they are quite foreign to our purpose. I intend to publish in a separate volume short notices of the medical authors and their works, and so we need not dwell on them here.

* * *

¹ पारसोक दवानी तु यवानी सहशी गुणः ।
विशेषात् पाचनी रुचा शाहिशी मादिनी गुणः ॥

Bhāva Prakāśa, I.

पारसोकवचा शुक्रा प्रीक्ता हेमवतौति सा ।
हेमवत्युदिता तदवातं हनि विशेषतः ॥

Ibid.

लक्ष्मसफलबौरमाफूकमहिकेणकम् ।

Ibid.

चोनाक सज्जः कपूरः कफचवकरः खूतः ।

Ibid.

खञ्जुरी गोमनाकारा परवीयादिहानता ॥

Ibid.

CHAPTER II.

HOSPITALS AND DISPENSARIES.

Before entering into our proper subject, it would not be amiss to notice here two objects—Hospitals and Anæsthetics—which are essentially necessary for the development of surgical knowledge. We know from the Edict II of Asoka that India during his reign was studded with hospitals not only for the treatment of human beings but also for the brute creations. But even before Asoka, hospitals flourished in India. In Caraka we can trace the germ of such an institution though it was used for rich men and did not accommodate the public.¹

¹ हृदं निवार्तं प्रवासैकदेशं सुखप्रविचारसनुपत्तकं धूमातपरजसामनभिगमनीयमनिदानाच
सद्य-स्वर्ण-रस-क्षयम्भान। सीपानोद्भवसुषलवर्चः स्वानभानभिमहानसंपर्ते वास्तुकिया-
कुशलः प्रसन्नं यद्यमेव तावत् पूर्वं सुप्रकल्पयेत्।

ततः शीलश्चानुरागदात्प्रादिवस्तोपयव्यानुपचारकुशलान् सञ्जकक्षेषु पर्यवदातान्
स्वर्णदिनपाचक्षापकसंवाहकोत्त्वापकसंवेशकोषधेपयकाशं परिचारकान् सञ्जकसंस्कृपति-
कुशलान्। तथा शीलवादिवीषापकश्चीक्रमाद्याविकितिहास-नुरागकुशलानाभिप्राय-ज्ञाननु-
सारांशं देवताकालविदः परिषद्याक। तथा लावकपिश्चलशशाह्रिणैनकालपुच्छकमध्यमाहको-
रसान्। गाढं दीम्बौं शीलवतोमनातुरो जीवितस्ता सुप्रतिविहितलग्नशरणवानोयम्। जल-
पाचाचमनीदिकोहमणिकपिठरवटकुशीकुशकृष्णशरावदव्यक्तिपरीयनमन्यानवेलशूचकार्पासी-
कांदैनि च जयनामनादीनि चौपल्यसामद्वारप्रतियहाचि सुप्रयुक्तालस्त्रीलरप्रकृदी-
मध्यानानि स्थापाश्रयानि संवेशनोपवेशनं हस्तेदाव्यहृपदेहे परिवेकानुलेपनवसनपिरेष्वना-
स्थापनानुवासन-जिरोविरेचनमूर्त्तिशारकर्म्मासुपचारसुखानिभुपक्षालितोपवानाऽन्त इच्छास्त्र-
मध्यमा दृश्यं अस्ति चौपकरशार्यानि।

धूमनेत्रं वक्षिनेत्रं चोत्तरवस्त्रिकच। कुशहस्तं तुलाष्टं भानमाल्यं एततेवसामज्ज्वलौ इ-
फाचितलवर्णमन्तर्कोदक-मधुसुरासौबीरकतुर्पोदकर्मसेदकदधिमल्लोदिष्मिहान्याम्बुद्धाचि च।
तथा शालिवदिकमुहमायवतिलकुलत्ववदरसदीकापकथाभयमनकविभीतकानि नाना-
विद्यानि च संहस्रीदापकरशानि द्रव्याणि तथेवोहुकरशानुलोमिकीभयमात्रि संयहनीयदीप-
नीयपाचनीयीपश्चमनीयवातहराचि समाजातानि चौपवानि यस्मान्पदपि किञ्चिद्यापदः
परिसंक्षेपकरणं विद्यते यज्ञं प्रतिभूतायं तत्तदुपकर्म्मेत्।

He advises us as follows:—The engineer is to erect a strong and spacious building, well-ventilated at one part, the other part being free from draughts. The scenery should be pleasing and one should feel happy to walk in it. It must not be behind any high building, nor exposed to the glare of the sun. It should be inaccessible to smoke and dust. There must not be anything injurious to our senses as regards sound, touch, taste, form and smell. There should be stairs, large wooden mortars and pestles; and there must be additional bare ground for the construction of a privy, bath-room and kitchen. The staff should consist of servants and companions. The servants should be good, virtuous, pure, fond, clever, generous, well trained in nursing, skillful in works, able to cook rice and curries well, competent to administer a bath, expert masseur¹, trained in raising and moving a patient, dexterous in making or cleaning beds, practiced in the art of compounding medicines and willing workers not likely to show displeasure to any order. The companions should be good singers and musicians, fluent speakers, well-versed in distichs, ballads, tales, history and mythology, well-acquainted with the design of a patient's nods or signals, agreeable and should have knowledge of the season and the locality. The various kinds of animals

¹ From the accounts of Megasthenes, we learn that four attendants used to massage him (Candragupta) with ebony rollers during the time that he was engaged in disposing of cases. Such an attendant (*sairvāhaka*) is a minor character in the Toy Cart or little Clay Cart, drama, transl. by Rydor, in Harvard Oriental Series, Vol. IX, 1905—Smith's Early History of India, 2nd Ed., Page 122. Footnote. We also find in the *Kāmandikya Nitisāra* that the king is cautioned against shampooers who have the opportunity of poisoning him.

मृदुल्यङ्गनकामारस्त्रपका व्यवकाशयत ।
प्रसाधका भीजकाप्रथा गावस्त्रवाहका अपि ॥

should always be kept in stock such as Lāva (*Perdix Chinensis*), Kapinjala (partridge), hares, sheep and the different kinds of deers, Ena (the black antelope) blacktailed deer, and Mṛgamañṭka. There should be a diary attached to the building. The cow should be good natured and healthy, and should yield profuse milk. The calves must be living. There should be stocked for them potable water and hay in a clean fold. In that building must be kept the following necessary articles :—

Water vessels, washing basins, tubs, jars, dishes, ghata, (small jars) kumbhi, kumbha (larger and smaller vessels), kundu (jug or pitcher), soraba (earthen basins), spoons or ladles, cooking utensils, churning rods, cloth, thread, cotton, wool, bedding and āsana (seats). Near them should be placed drinking vessels of gold and spittoons. The bedding should consist of a broad carpet, bed-sheet, pillows, and a bedstead. There should be collected good furnitures for beds and seats ; and also utensils and appliances for application of oleaginous medicines, heat, oil, ointment, bath and perfumeries, and for the acts of emesis, purgation, draining of the brain, injection into the rectum, defaecation and urination (i.e. Vastiyantra, urinal, bed-pan &c.). The blunt and sharp instruments and their accessories, well-washed mullers and whetstones of different degrees of smoothness—polished, plain or rough—should be near at hand ; the tubular instruments for fumigation, inhalation and injection into the rectum, urethra and vagina, should be available there ; and the following articles are also to be stocked :—brushes and brooms, weighing scales and weights, ghee (melted butter), oil, fat, marrow, honey, molasses, salt, wood, water, spirituous liquor formed by steeping husked grains of barley in water, or by boiling together the husks of fried māskalīya

(pulse of Phaseolous Rox.), barley and water, spirituous liquor from the blossoms of Lythrum Fruticoscence with sugar, spirit distilled from the different sorts of grains, curdled milk, rice, gruel, whey, sour liquid produced from the acetous fermentation of powdered paddy, and the various kinds of urines of animals. Different kinds of rice such as *Sāli* (or that reaped in cold season) and *Sāsthika* (or that grown in hot weather in low lands and reaped within sixty days of its sowing), *Mudga* (*Phaseolus mungo*), *Mīṣa* (*Phaseolus Rox.*), *Yava* (*Hordeum Vulgare*), sesame (*Seasamum Indicum*), *Kullatha* (*Dolichos Bitlorus*), plums (*Zizyphus Jujube*), raisins (*Vitis Vinifera*), *Parusa* (*Grewia Asiatica*), *Abhayā* (*Chebulic Myrobalan*), *Amlaki* (*Phyllanthus Emblica*), *Vibhitaka* (*Terminalia Bellerica*) and other classes of medicaments, as oils, diaphoretics, sternutatories, cathartics, emetics, purgatives, astringents, stomachics, digestives, calminatives, carminatives and various other forms of medicines, are required for treatment. Besides these, there must be stored the antidotes to poisons caused by overdoses of medicines and other appliances likely to add to the patient's comfort.

To this may be compared the description of the Greek iatrium, which is mentioned in the Hippocratic treatise, *De Medicio*. He directs that "it should be so constructed that neither the wind nor sun might prove offensive to the patient, and goes on to enumerate the various articles which it should contain, such as scalpels, lancets, cupping-instruments, trepans, raspatories, with bandages and medicines."¹

¹ Works of Hippocrates, Syd. Soc., Vol. II, page 470, Postnote.

Suśruta gives us a list of appliances¹ required in surgical operations:—

1. Blunt Instruments.
2. Sharp Instruments.
3. Potential Cautery.
4. Actual Cautery.
5. Śalākā or rods.
6. Horns.
7. Leeches.
8. Hollow bottle gourd.
9. Jāmbav-ouṣṭha [a bougie of blackstone, the extremity of which is shaped like the fruit of the Jambul tree (*Urginea Jāmbolana*)].
10. Cotton.
11. Pieces of cloth.
12. Thread.
13. Leaves.
14. Materials of bandaging.
15. Honey.
16. Ghee, or clarified butter.
17. Suet.
18. Milk.
19. Oils.
20. Tarpun.—flour of any perched grain or condensed milk etc. mixed with water to mitigate thirst.
21. Decoctions.
22. Liniments.
23. Plasters.
24. Fan.
25. Cold and hot water.
26. Iron pans, kalasi and other earthen vessels; bedfings and seats.
27. Obedient, steady and strong servants.

The Lying-in-room.—Caraka says: “Before the ninth month of pregnancy, the lying-in-room should be constructed. The land should be cleaned of bones, gravels and potsherds. The ground selected should be of auspicious colour, taste and smell. The gate of the house should face towards the east or the north.² There must be a store of wood such as Vilva (*Aegle*

¹ अतोऽनामतं कर्त्तुं चिकीपूर्वा बैयेन पूर्वमेवीपकस्यवित्तचानि रद्यदा यत्प्रशस्तचारादिश्चाकाश्चलौकालावूज्ञवीष्टिपिचूर्णितम् चपचपइमधृष्टवसापवस्त्रेतत्पंक्तयायभेषन खल्लवज्जनगीर्तीचीदक बटाहदैनि पारकर्मवज्ज्व छिप्ता: स्थिरा बलवनः।

Suśruta Saṃhitā, I. v.

² “The best sort of ground should abound with milky trees, full of fruits and flowers; its boundary should be of a quadrangular form, level and smooth, with a sloping declivity towards the east producing a hard sound, with a stream running from left to right, of an agreeable colour, fertile, of an uniform

Marmelos), Tinduka (*Diospyros Embryopteris*), Inguda (*Balanites Rox.*) Bhallākaka (*Semecarpus Anacardium*), Vāruṇa (*Ocimum Basilicum*), Khadira (*Acacia Catechu*) or wood of other kinds said to be auspicious by a Brāhmaṇa versed in the Atharvaveda; and there must be a sufficient provision for clothes, liniments, and covers. For the pregnant woman, be careful to have a fire-place, water, pestles and mortars, a privy, a bathing place, and ovens. These should be constructed according to the science of engineering and should be pleasant with regard to the season. There should be collected clarified butter, oil, honey, different kinds of salts as rock salt, sonchal salt, and, black salt, Viḍāṅgas (*Embelic Ribes*), treacle, Kuṭha (*Saussurea Lappa*), Kilima (*Pinus Deodara*), Nāgara (dried root of *Zinziber Officinale*), Pippali (*Piper Longum*), its root, Hastipippali (*Scindapsus Officinalis*), Mandukparni (*Hydrocotyle Asiatica*), Elā (*Eleptarium Cardamomum*), Lāngolt (*Gloriosa Superba*), Vāca (*Acorus Calamus*), Cavya (*Piper Cava*), Chitraka (*Plumbago Zeylanicum*), Chiravilva (*Pongamia Glabra*), Hingu (*Ferrula Assafetida*), Sarṣapa (Mustard seeds), Laśuna (*Allium Sativum*), finely or thickly powdered rice, Kadamba (*Anthocephalous Kadamba*), Ātasi (*Linum Usitatissimum*), Vallija (*Cucurbita Pepo*), Bhurya (*Betula Bhojpatra*), Kulatha (*Dolichos Uniflorus*), Maireya (a spirituous liquor from the blossoms of *Lythrum Fruticoscence*) and Āshaya (Vinous fermented liquor from sugar or molasses, Rum). Also collect two pieces of

colour containing a great quantity of soil, producing water when dug to the height of a man's arm raised above his head, and situated in a climate of moderate temperature."

Manosara, Ch. I. quoted in Ram Raz's The Architecture of the Hindus, Page 19.

stone (muller and stone slabs), two pestles, two mortars, an ass, a bullock, two sharp needles of gold and silver, two skeins of threads, sharp instruments of steel, two wooden bedsteads (*Egle Marmelos*), and wood (*Tinduka* and *Ingudi*) for easily igniting fire. The female attendants should be mothers of children, and friends and relatives of the patients. They must be fond of her, skillful in work, intelligent, jolly, laborious full of tender love for the children and a favourite of the mother."¹

The Child's Room :—He continues—"The engineer is to construct a room, spacious, beautiful, full of light, well-ventilated but free from draughts, strong, and free from beasts of prey, animals with fangs, mice and insects. There should be kept water, mortar and separate places should be assigned for bathing, cooking, urination and defecation. It should suit the season of the year. The beddings, seats and covers should be comfortable and suitable to the season. Auspicious ceremonies should be performed in that room such as *homa*, expiations and presents to gods, for the proper protection of the child; and there should be present pious old men, doctors, and devoted

¹ श्रावकं चैवासांगं नवमान्द्रासात् सुतिकामार्थं कारयेदपहतास्तिभक्तरकपालेदेशं प्रभस-
कपरसमन्वायो भूमौ प्राग्दारमुद्दग्धारं वा । तत्र वैवाहारों काढानां तिन्दुकेहुदानां भज्जात-
कामो वाक्षानां छट्टिरानीं वा वानि चानाम्पि ब्राह्मणाः श्रेसुरवर्णवेदविदसाहस्रालेप-
नाकादनापिधानसत्यदुपेतं तत् । वास्तु-विद्या-हृदययोगेनापिस्तिलीलुखलवर्चःस्यानकानमूर्मि-
नहानसस्तुसुख्य । तत्र सपिक्षेलभृष्टेन्द्रवौवर्वलकाललवचिविद्विगुडकुहकितिमनावर-
पिधलीमूलहस्तिपिधलीमध्यक्षयंत्वात्तात्त्वीवचावच्चविचक्षिविद्विगुडपर्यं
लग्नकन-
कनिकानोपात्तीवक्षिविभूत्वा: कुलत्वमेरिवसुरासवाः सविभित्ताः सुः ॥ नवामानीं
हीं हे चक्रमूर्खे हे चक्रमूर्खे खरी इष्मय ही च तीक्ष्णी शौचोपिष्ठलकी सौवर्चंराजती हे
इष्मय च तीक्ष्णायसानि ही च विवरमयी पर्यादी तेन्दुकेहुदानि काढाद्यपिस्तुश्चानि
स्तियथ वही वहुःप्रजाताः सौहाँसुकाः सुतसमन्वरकाः प्रदर्शनाचाराः प्रतिपिङ्कुश्चतः
प्रक्षिविद्वत्सलाक्षवत्तिष्ठादाः श्रेसुरविष्णवीमिमता भाग्यवायवेदविद्वदी यज्ञान्वदपि तेष
समयं भवेत यह ब्राह्मणः ब्रूः स्तियथ उद्दासत्कार्यम् ॥

attendants constantly. The child's bed, covers and sheets should be soft, light, pure and scented. These should always be free from sweat, dirt, worms or bugs, urine and faeces. If repeated change of new clothes be impossible, the soiled coverings should be well washed and the beddings well purified with steam and thoroughly dried before they are used again. To purify or sterilise the dress, beddings, coverings and sheets by fumigation use the following medicines with clarified butter:—Barley (*Hordeum Vulgare*), mustard seeds, linseeds, assafœtida, Guggula (*Balsamodendron Mukul*), Vāca (*Acorus Calamus*), Coraka (*Andropogon Acicularis*), Vayasthā (*Chebulic Myrobalan*), Golomi (*Panicum Dactylon*), Jaṭilā (*Nardostachys Jatamansi*), Palankaṣā (a variety of Guggula), Aśoka (*Saraca Indica*), Rohini (*Picerorrhiza Kurroa*) and snakes' skin.....A variety of toys to please the child should be at hand and these should be coloured, light, musical, beautiful and must not be sharp pointed. They should be of such a size and shape as cannot be put into the child's mouth or do not terrify or kill the child.”¹

¹ अतोऽनन्तरं कुमारागारविधिमनुष्यावास्थामः ॥ मानुविदाकुञ्जलः प्रशस्त इदमन्तमन्तकृतिः निवासं प्रवातैकदेशं हठमपत्रवापदयदेहिमूषिकपतङ्गं सुसंविभक्तसिलिंद्रिष्टस्तम्भूचवचं च स्थानव्यापानमूर्मिमहानसंस्तुमुखं दद्यतु ग्रयनास्तनकरवस्तम्भवद्वं कृत्यात् । तथा सुविहित-रचाविधानविलिमडलहीमप्रायविद्यं गुच्छिडवैद्यानुरक्तजनसम्भूतिमिति । कुमारागारविधिः ॥ ग्रयनास्तनकरवस्तम्भवद्वानि कुमारस्य गदुलत्रयविसुगन्तीनि स्युः । स्वेदमलजनुमन्ति मूष्पपौरी-वीपस्तदानि च वडन्तानि स्युः ॥ असमि सम्बैवद्वीषी तान्दीव च सुप्रवालितपीथानानि सुधूषितानि सुशब्दयक्षास्तुपर्यामे गच्छेतुः । धूपानानि पुनर्वासनां ग्रयनास्तनकरवस्तम्भवद्वानावयवसर्वपातसौहित्यग्न्युत्तवाचीरकवयः स्थानोलीभीजटिलापत्रदधारीकरोहिणीसर्पेनिष्ठांकानि धृतेभग्यपुकानि स्युः ॥ मण्डवय धारणीयाः कुमारस्य खडकवगवयवस्तम्भानां जीवतामेव दक्षिणीवी विषाणेव्याच्याचि यद्दीक्षानि स्युः । मनादावीवधयी जीवकर्यभक्ती च यान्वयनानि वाञ्छानाः प्रसंसुद्धुः । कौड़नकानि खदवस्य तु विचित्राचि योषवन्पर्मिरामाचि अमुकव्यातीकादानि अनास्त्रपतेश्वीनि अपाणाहराचि अविलासनानि स्युः ॥

Suśruta directs that there should be a particular room provided for patients who have undergone surgical operations.¹ "Patients suffering from surgical diseases as inflammatory swelling, wounds &c. should, from the very commencement of their illness, confine themselves inside a clean house, situated in a wholesome locality, free from draughts and not exposed to the glare of the sun. For, in such a building, constitutional, mental and accidental diseases are not likely to occur. In that room, the bed for the patients should be soft, spacious, and well-arranged. The patient should lie down, his

¹ तत्किनः प्रयमसेवागारमन्विच्छेत्तदाशारं प्रशस्तवाक्षादिकं कार्यं ।

प्रशस्तवामूर्तिरहं साचावातपवच्छिते ।

निवासे न च रोगा: मूर्ति शारीराग्नुमानसाः ॥

तत्किन् ग्रहनमस्वार्थं स्तासीर्णे मनीजः प्राक्भिरस्तु सशस्त्रं कुर्वते ।

सुखचेष्टाप्रचारः सात् स्तासीर्णे जस्ते मनी ।

प्राच्या दिशि स्थिता देवास्तपूजार्थं नतं शिरः ॥

तत्किन् सुहडिरत्तकूले: प्रियमदैरप्राप्यमनी यथेष्टमासीन् ।

सुष्ठदी विचिपन्वाय कथाभिवृत्वेदना: ।

आश्वासयनी वहस्तत्तकूलः प्रियमदा: ॥

न च दिवानिद्रावश्च: सात् ।

दिवासप्रातुर्णे कल्पूर्णीवाला गौरवं तथा ।

ब्रह्मुर्वेदनारागः सावदेव भजे भवेत् ॥

उत्तानसंवेशनपरिवर्तनचक्रमाणोऽच्चर्भायकादिषु चाचचेष्टासप्रमाणो इत्यसंरचेत् ।

स्तानासनं चक्रमणे यात्यानातिभाषणे ।

तत्त्ववाङ्ग निषेदेत् शक्तिमानपि मानवः ॥

तत्त्वानायासानं स्तानं जप्त्वा धातिनिषेदिता ।

प्रापुयान्वाहतादेत् ऋजस्त्वादिवर्ज्येत् ॥

यन्मात्रात् स्तोत्रा चन्द्रशैलमस्त्रायणसम्प्रज्ञनानिदूरतः परिष्वरेत् ।

head pointing towards the east, and keep there some weapon for his own protection. On such a bed, the patient can lie comfortably and turn to his sides at pleasure. He should be surrounded by his dear friends, for their sweet words relieve the pain of inflammation. The female friends, however, should be avoided and kept at a distance. He should observe strictly the orders of the surgeon as regards his food, drink and mode of living. He should have his hairs clipped and nails pared short, be pure in his person, put on white clothes and devote himself to religious duties. A light should be kept burning; and garlands of flower, weapons &c., should be provided in the room to ward off the demons. He should be cheered and inspired by pleasant stories; and the physicians and the priests should attend the patient morning and evening. Pastils made of Sinapis Nigra and Azadirachta Indica with clarified butter and salt, should be burnt in the room morning and evening for ten days continually. The inflamed part should be fanned with a *cāmar* or yolk-tail. Sleep during the day, exercise and sexual intercourse must on no account be indulged in."

Suśrata also describes the kitchen of the king thus:— "That is the proper kitchen which is built on good ground, towards an auspicious quarter, full of utensils for cooking, spacious, clean, provided with windows guarded by a network, frequented by friends, cleared well of grass furnished with a canopy, purified by auspicious ceremonies, and managed by men and women of good character. The superintendent of the kitchen should, like the doctor, be noble and virtuous. The cook and servants should be pure, noble, capable, mild, good looking, engaged in their respective duties, high-minded, should have their hairs and nails cut short, steady,

well-bathed, of subdued passion, well-dressed, obedient and have their heads well-covered."

"The doctor in charge of the kitchen should be of noble family, religious, friendly, a clever manager for getting king's food properly prepared, ever careful for his health, non-avaricious, simple, fond, grateful, good-looking, cool-tempered, well-behaved, not proud and envious, laborious, of subdued passion, forgiving, pure, of good character, kind, intelligent, not easily fatigued, always loving, well-wisher, capable, bold, clever, skillful, not unreasonably tender, provided with medicines and well proficient in the art of healing."¹

¹ कुलीनं धार्मिकं चिर्यं सूचतं सलतोत्तितं ।
अलव्यं चक्षुं भज्ञे कृतज्ञं प्रियदर्शनं ॥
क्रोधपाकवात्सर्वं मदाहसा विवर्जितं ।
जितेन्द्रियं चाचावनं गुच्छं शोकदयानितं ॥
मेधाविनमसंशालामनुरत्नं हितैविगतं ।
पटुं प्रगल्भं निपुणं दचं मावाविवर्जितं ॥
पूर्वोत्तेष्य गुच्छुङ्कं निन्दा सत्रिहितागदं ।
महानसे प्रयुक्तोत्त वैद्यं तदिदपूर्जितं ॥
प्रशसदिग्देशहतं गच्छभाग्नं भद्रकुचि ।
सजालको गवाचाद्य भाववर्णं निवेदितं ॥
विकचसदसंस्थानं सवितानं लक्षात्मनं ।
परीचित फौयुक्ते भवेत्तापि महानसे ॥
तचाप्यवं नियुक्तोत्त प्रादी वैद्यगृष्णानितं ।
शुचयो दचित्ता दचाः विनैता; प्रियदर्शनाः ॥
सविभक्ताः सुमनसाँ नौत्रं केशनखाः लिराः ।
खाताहड़; संयमिनः कृतीचीयाः सुसंदुत्ताः ॥
तस्याचाद्या विधेयासु विविधाः परिकर्मिणः ।
चाहारस्त्रित यशापि भवनि प्राणिनो यतः ॥
तथान्याहानसे वैद्यः समाद् रहिती भवेत् ।
माहानसिक बौद्धारः सौर्योदिलिक पौपिकाः ॥
भवेयुक्त धवश्चाय चाप्यन्ये तु केचन ।
इहितहो मनुष्याणां वाक्चेष्टभुख्वेक्तेः ॥

In the Kāmandakiya Nitīśāra, we find the king advised to take thoroughly examined food, and to be surrounded by physicians well-versed in the science of Toxicology;¹ and again it is said that king should take his medicines, cordials, and edibles after having his medical attendants tasted them.² The king is advised to kill his enemy by weaning over his physician or by administering poisonous liquids.³

In the Mahāvāgga⁴ we find the qualities of a good patient and a good nurse described :—

“ 6. What are five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon—

When he does do what is good for him ; when he does know the limit (of the quantity of the food) that is good for him ; when he does take his medicine, when he does let a nurse who desires his good, know what manner of disease he has, or when he is getting worse that that is so, or when it is getting better that that is so ; and when he has become able to bear bodily pains that are severe, sharp, grievous, disagreeable, unpleasant and destructive to life. These are the five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon.

¹ विषद्वैकदके: सातः विषद्वैनिभूषितः ।

परीचितं समश्रौयाद्वावृत्ताविधिप्रवतः ॥ १० ॥

Kāmandaka Nitīśāra vii. v. 10.

² औषधानि च सर्वानि पानं पानोयसेव च ।

तन्त्रकल्पकैः समान्तराद् प्राश्रौयाद्वृत्तानि च ॥ २० ॥

Ibid. vii. v. 27.

³ भिषज्मेदेन वा शतुं रसदानेन साम्यदैत् ॥ ०० ॥

Ibid. IX. v. 70.

* Mahāvāgga viii. 26, 6 & 8 (Sacred Books of the East).

8. There are five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task—when he is capable of prescribing medicines ; when he does know what (diet) is good and what is not good for the patient, serving what is good and not serving what is not good for him ; when he does wait upon the sick out of love, and not out of greed ; when he does not revolt from removing evacuation, saliva or vomit ; when he is capable of teaching, inciting, arousing and gladdening the patient with religious discourses. These are the five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task."

There is also good deal of evidence to show that medicines were distributed free to the poor and to the pious men. When Visakhā asked for eight boons of the Buddha, she mentioned amongst them the privilege of bestowing her life long " food for the sick, food for those who wait upon the sick and medicines for the sick " and explained her reasons as follows¹ :—

" 9. Moreover, Lord, if a sick Bhikkhu does not obtain suitable foods, his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the diet that I shall have provided for the sick neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Samgha my life long with diet for the sick.

Moreover, Lord, a Bhikkhu who is waiting upon the sick if he has to seek out food for himself, may bring in the food (to the invalid) when the sun is already far on his course, and he will lose the opportunity of taking his food. But when

¹ Mahāvagga VIII, 15-9.

he has partaken of the food I shall have provided for those who wait upon the sick, he will bring in food to the invalid in due time and he will not lose the opportunity of taking his food. It was this circumstances, Lord, that I had in view in desiring to provide the Samgha my life long with food for those who wait upon the sick.

10. Moreover, Lord if a sick Bhikkhu does not obtain suitable medicines his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the medicines which I shall have provided for the sick, neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Samgha, my life long with medicines for the sick."

The Edict No. II of Asoka clearly shows that charitable institutions were common in India, during his reign. The Edict runs as follows:— “

“ Everywhere in the kingdom of the king Piyadasi, beloved of the gods, and also of the nations who live in the frontiers such as the Cholas, the Pandyas, the realms of Satyaputra and Keralaputra, as far as Tumbapani, (and in the kingdom of) Antiochus, king of the Greeks and of the kings who are his neighbours, everywhere the king Piyadasi, beloved of the gods, has provided medicines of two sorts, medicines for men and medicines for animals. Wherever plants useful either for men or for animals were wanting they have been imported and planted. Wherever roots and fruits were wanting, they have been imported and planted. And along public roads, wells have been dug for the use of animals and men.”

We also learn from Houen Tsang's account that Śīlāditya II

(610 - 650 A. D.) was inclined towards Budhism and he forbade the slaughter of living animals, built *stupas*, and "in all the highways of the towns and villages throughout India, he erected hospices, provided with food and drink, and stationed there physicians with medicines for travellers and poor persons round about, to be given without any stint."¹

He also mentions about the father of the Bhikkhu Śrutavimśatikoti, that "from his house to the snowy mountains, he had established a succession of rest-houses, from which his servants continually went from one to the other. Whatever valuable medicines were wanted, they communicated the same to each other in order, and so procured them without loss of time, so rich was this family."²

He also mentions charitable institutions called *Punyasalas* as common in India. "There were formerly in this country (Tsch-kia-Takka) many houses of charity (goodness or happiness, *Punyasalas*) for keeping the poor and the unfortunate. They provided for them medicines and food, clothing and necessaries; so that travellers were never badly off."³

Again he says: "Benevolent kings have founded here (Mo-ti-pil-lo or Matipura) a house of "merit" (*Punyasalas*). This foundation is endowed with funds for providing choice food and medicines to bestow in charity on widows and bereaved persons, on orphans and the destitute."⁴ A similar *Punyasala* or hospice was in K'e-P'an-to (Kabandha).⁵ In describing

¹ Beauf's Record, Vol. I, p. 214.

² *Ibid.*, Vol. II, p. 188.

³ *Ibid.*, Vol. I, p. 165.

⁴ *Ibid.*, Vol. I, p. 198.

⁵ *Ibid.*, Vol. II, p. 303.

Multan he says: "They have founded a house of mercy (happiness), in which they provide food, and drink, and medicines for the poor, and sick, affording succour and sustenance."¹ Of Śilāditya he says: "Every year he assembled the Sramanas from all countries, and on the third and seventh days he bestowed on them in charity four kinds of Alms (*viz.*—food, drink, medicine, clothing)."²

Fa Hian (405-11 A.D.), a contemporary of Candragupta Vikramāditya, describes the charitable dispensaries in the town of Pāṭaliputra thus:—"The nobles and householders of this country have founded hospitals within the city to which the poor of all countries, the destitute, cripple and the diseased may repair. They receive every kind of requisite help gratuitously. Physicians inspect their diseases, and according to their cases order them food and drink, medicines or decoctions, every thing in fact that may contribute to their ease. When cured, —they depart at their convenience."³ Smith remarks: "No such foundation was to be seen elsewhere in the world at this date; and its existence, anticipating the deeds of modern Christian charity, speaks well both for the character of the citizens who endowed it, and for the genius of the great Aśoka whose teaching still bore such wholesome fruit many centuries after his decease. The earliest hospital in Europe the *Maison Dieu* of Paris, is said to have been opened in the 7th centuries."⁴

"Upatisso, son of Buddha Das, builds Hospitals for cripples,

¹ Beal's Record, Vol. II, p. 274.

² *Ibid.*, Vol. I, p. 214.

³ *Ibid.*, Vol. I, Intro. loii.

⁴ Smith's Early History of India, 2nd Ed., p. 280.

for pregnant women, and for the blind and diseased.¹ Dhatushena builds Hospitals for cripples and sick². Buddha Das³ himself ordained a physician for every ten villages on the high road, and built assylums for the crippled, deformed and destitute."⁴

The animal Hospitals or Piñjrapoles which still exist at Ahmedabad, Surat, and Sodepore in Bengal, and elsewhere may be regarded as the survivals of the institutions founded by the Maurya monarch. The following account of the Surat Hospital in the 18th century is from the pen of Hamilton:—

"The most remarkable institution in Surat is the Banyan Hospital, of which we have no discription more recent than 1780. It then consisted of a large piece of ground enclosed by high walls, and sub-divided into several courts or yards for the accommodation of animals. In sickness they were attended with the greatest care, and here found a peaceful assylum for the infirmities of old age.

"When an animal broke a limb, or was otherwise disabled, his owner brought him to the Hospital, when he was received without regard to the caste or nation of his master. In 1772 this hospital contained horse, mules, oxen, sheep, goats, monkeys, poultry, pigeons, and variety of birds; and also an aged tortoise, which was known to have been there seventy-five years. The most extraordinary ward was that appropriated for rats, mice, bugs, and other noxious vermins for whom suitable food was provided."⁵

¹ Mahāwanī, p. 249.

² *Ibid*, p. 245.

³ *Ibid*, p. 256.

⁴ Cunningham's Bhilas Topes, p. 54, foot note.

⁵ Hamilton's Description of Hindustan (120) Vol. I, 'p. 718, quarto ed., Crooke. Things Indian, Art. Piñjrapole, (Murray 1906).

We quote here from Hemādri the opinions of the sages and the Purāṇas as to the merit of the founder of a hospital¹ :—

Visvāmitra.

There is no gift more precious than the gift of cure ; therefore it should be given freely to the sick to augment one's good fortune. He who gives medicines, diet, food, oil for smearing and shelter to the sick, becomes free from all diseases.

Samvartta.

The giver of medicines, oleaginous remedies and food for the cure of the sick, becomes free from all diseases, happy and long-lived.

Agastya.

Those who give rice and medicines freely attain happiness, being free from disease.

Sāvara Purāna.

He, who gives medicines to the sick to cure their diseases always remains healthy, long-lived and happy.

¹ अथ आरोग्यदानं ।

तच्चारोग्यदानकालं दुष्टते ।

आह विश्वामित्रः ।

आरोग्यदानात्परमं न दानं विद्यते कथित् ।

अतोदैवं कर्त्तारांगामारोग्यं भाग्यददये ॥

बीपं पश्चात्ताहारं तेलाभ्युप्रतिवर्य ।

यः प्रयत्नति रीतिभ्यः समवेदाधिविजितः ॥

संवत्सः ।

बीपं खेह-माहारं रीतिभ्यः रीतिभ्यः ।

ददानी रीतिभितः सुखी दीपांशुरेत च ॥



Nandi Purāna.

The high-souled man who gives the Brahmins collyrium in charity to cure the diseases of the eye, goes to the Sun (after death) and becomes free from eye deseases, fine-looking and fortunate.

Good health is a step to the acquirement of religious merit, wealth, pleasure and final emancipation, and so the man who bestows cure to the sick and also he who erects a hospital equipped with good medicaments, dresses, learned doctors, servants and rooms for students, always gain them. The doctor should be well-versed in the religious treatises, experienced, familiar with the actions of medicines, a discriminator of the colour of the roots of the herbals and well-acquainted with the

अगस्त्यः ।

अद्वौ-वधमदातारः सुखं यानि निरामयाः ।

सौर पुराणे ।

रीगिषी रीगजात्यर्द्दीप्तिः यः प्रयच्छति ।

रोकहोनः स दीक्षीयुः सुखो भवति सञ्जदा ॥

नन्दि पुराणे ।

अहम् यो नरोद्यादप्युत्थिनिरुद्धये ।

विश्राव स पुमान् याति सूर्यलोकं महामतिः ।

आटीम्बनयनीं दिव्यः सुभग्नी जायते वरः ॥

तस्मिन्ब्रेव पुराणे ।

धर्म-र्थ-काम-मौद्याशी आरोग्यं साधनैर्युतः ।

अतक्षरारीवदानेन नरो भवति सञ्जदा ॥

आटीम्बनाली कृष्टे महीषधपरिकदा ।

विद्यमैद्यसंयुक्ता शत्रावसदसंयुक्ता ॥

proper season of raising them from the ground, well-trained with the qualities of the juices, (their strength and actions), sūli rice, meat and medicaments, trained in compounding medicines, one who knows well of the physique of men by intelligence, one who knows the temperament and the qualities of the diet, a pathologist who is not idle, well acquainted with the remedial agents for the premonitory signs and sequelae of diseases, proficient in the requirements of time and place, well-read in the medical text-books—the Ayurveda with its eight divisions and an expert in curing diseases by domestic remedies (prepared from handful of common ingredients).

The pious man who erects such a hospital in which the services of good physicians of this nature are retained, becomes celebrated as the virtuous, the successful and the intelligent

वैद्यस्तु जाक्षित् प्रूढोः दृष्टीवधपराक्रमः ।
चौषधीमूलवर्णान् समुद्ररथकालवित् ॥
रसवीर्यविधाकान् शालिमासौषधीगते ।
योगविहेनिन् देहं यो चिया प्रविशेदुधः ॥
धातुपथस्यश्व निदानविद्वन्दितः ।
ज्याधीना पूर्वलिङ्गान्तु रथविधानवित् ॥
देशकालविधानज्ञविकित्साशास्त्रविज्ञया ।
अष्टावड्डानि मुहियोगविधानवित् ॥

अष्टावड्डानि आयुर्वेदस्य ।

यदाश्रलं जाक्षाक्षं कायचिकित्सा भूतविद्या कौमारभूत्वमगदत्वं रसायणत्वं वाजी-
करणत्वमिति सुयुतीकानि ।

एवं विद्यः शर्मो वैदो भवेद्यथाभिव्यक्तिः ।
आरोग्यग्रालामवन् त्रुयादीष्वर्णसंवयः ॥
स पुमान् धार्मिकी लीके स लतादः सुवृद्धिमन् ।
समवारीग्रज्ञालायामौषधेः सेहपाचर्णः ॥

man in this world. If in such a hospital the kind-hearted man can cure a single patient of his maladies by simple medicines, oleaginous remedies and compounds of medicinal decoctions, goes to the Brahma's residence with his seven generations upwards. The rich and the poor acquire religious merit in proportion to the amount of riches they possess; where would the poor man get a hospital and a young physician to cure his diseases? The man secures the eternal regions mentioned before by rendering the sick healthy by the use of roots to some and by good rubbing (with external applications) to others. He who cures the sick suffering from an increase or decrease of the Air, the Bile and the Phlegm by simple remedies, he too goes to such blessed regions (after death) as are secured by those who perform many religious sacrifices (Yajñas).

ज्ञातिने विहीनी कुत्रि अग्रकं करुषायुतः ।
प्रथाति ब्रह्मददने कुलसुनकसेयुतः ॥
आश्री विदानुभारेण दरिद्रः कलभाग् भवेत् ।
दरिद्रस्य कुत्रि शाला आरोग्याय सिषम्बुवा ॥
अपिनूलिन केनापि महेनादैरवधापि वा ।
सखीकृते भवेन्द्रतेऽपि पूर्वोत्ते लीकमव्यये ॥
वात-पित्त-काशानां चवा-पच्चामेदिना ।
यन्तु साक्षात्पाथेन भीचयेत् ज्ञाधिपीडितान् ॥
सीपि याति यमान् लीकान् अवाप्यान् वज्राजिभिः ।

स्कन्दपुराणे ।

आरोग्यं शाला यः कुवान् महावैद्यपुरस्तुताः ।
मर्वोपकर्णोपेतां तस्य पुण्यफले प्रशु ॥
धर्मो-र्च-काम-भौवालामारीन्वं साधनं वतः ।
तक्षादारीन्व दोनेन तद्वत् स्यादतुदये ॥
अद्यक्षार्थं विदांसे मर्वीकृत्वा प्रयत्नतः ।
प्रातीति मुमहस्युप्लवनन् उद्यवजिते ॥
ज्ञानयोगरते शान् रोमात्मं जिवयीगिनेः ।
यः स्वस्यं कुरुते सीपि सर्वदानकले लभेत् ॥

Skandapurāna.

Hear, the amount of religious merit secured by a man who erects a hospital containing all the necessary articles (of treatment) and in which are engaged eminent physicians by reward. As good health is the means of attaining religious merit, wealth, pleasure and final emancipation, therefore, he by rendering the sick healthy, gives these four blessings.

By carefully curing a learned man of his sickness great merit is secured, which is eternal and indestructible. He too who cures a sickman who is calm and absorbed in meditation of Siva and knowledge, attains the virtue of all kinds of gifts. Bramhā, Visñu, all the gods, diseases, relatives and kings—they are obstacles to yoga but not to those who perform it (yogi). Whatever merit is obtained by the great, by supporting the sick Brāhmans (priests), Kshatriyas (warriors), and Biṭh (cultivators) and Sudras (servants), can not be obtained by the performance of all the great Yajñas (religious ceremonies). As even the gods can not reach the end of the

ब्रह्मा विष्णुः सूर्यः सर्वे व्याधयः स्वजना नृपाः ।

यीमस्यैते महाविद्या व्याधयस्ते न यीमिनो ॥ ० ॥

ब्रह्म-चण्डिय-विट्-शूद्रान् रीगाचान् परिपाल्य च ।

यनुस्तु महदाय्यीति न तकर्वमहामस्तुः ॥

आकाशस्थ वथा नातः सुरैरप्युपलभते ।

तददारीश्वदानस्य नानीवै विद्याते क्वचित् ॥

पुरुषेनानेन भइता गत्वा शिवपुरे नरः ।

भीदते विविधभग्निभिस्तानि; सञ्जकामिकैः ।

एकविंशत्कृत्यायेतः सभवतः परियालितः ।

आत्मे शिवपुरे तोवद्यावदाहतस्त्रिवं ॥

ततः स्वधर्माश्रेष्ठम् संप्राप्तः प्रवतः सदा ।

ज्ञानमुपदाते तस्य रुद्रेभ्यः परिचारकः ॥

* स्वेन यीमिनाभिति वा पाठः ।

firmament, so there is no end (to the merit) of the gift of cure. By this great merit, the man reaching the region of Siva enjoys himself by soaring in a balloon which can go to the various desired directions. With his twenty-one generations upwards and surrounded by his servants, he stays in the Siva's realm so long till deluge does not occur. There, after the lapse of his merit, the devoted servant acquires knowledge from Siva.

Abandoning this world by knowledge, abiding by the prayers to Siva, and casting away this body as a straw, he reaches beyond the limits of sorrow. Being freed from all sorrows, becoming pure, all-knowing and self-sufficient, and absorbed in his ownself, they are called the Liberated. Therefore to mitigate the diseases, the sick should be well nursed; the great sages should especially be attended to even by the sacrifice of one's body or riches. The wise must not irritate the weak patients, and they like the preceptors should be rescued constantly from sins. He who relieves the sick, by taking them under his care, reaches the other bank of this ocean of world.

आनादिरक्तः संसाराच्छिवध्यानमुपार्चितः ।
सदृष्टं लक्षणवत्ताका सर्वदुःखानभाप्रयात् ॥
समस्तदुःखनिवृत्तेः यद्दृः स्वाक्षर्यवस्थितः ।
सर्वज्ञः परिपूर्ण भूमि इत्यमिघौथते ॥
तथाहीगापवर्णावै शीरात्म समुपावरेत् ।
विशेषेष तु दीर्घीन्द्र जरीरेण धनेन च ॥
रीतिशो नीतिवित् प्राणी दृष्ट्यानपि सर्वदा ।
तान् पापाङ्गुरवश्वित्यमिवव्यर्थः पवर्तते ॥
यीन्द्रस्त्रहीतमात्रानं भवमानो दिने दिने ।
चपसर्वत रीतार्थं स्त्रीर्थस्तेन भवार्थावः ॥

इत्यारोग्यदानं ।

After these proofs, the statement of Mr. Ameer Ali that "the Arabs invented chemical pharmacy, and were the founders of those institutions which are now called dispensaries"¹ can not be accepted as correct.

DISPENSARIES.

As regards dispensaries, Suśruta advises the physician to construct his dispensary in a clean locality; and the building should face towards some auspicious direction as the east or the north. He says:—"The medicines should be kept in burnt earthen pots arranged on planks supported by stakes or pins".² This is still the method of storing medicines used by the *Kavirājas*. Dallvāṇa explains the passage thus:—"The medicines should be kept in pieces of cloth, earthen pots, wooden pots and Śāṅku (kīlaka)."³ The former explanation is plausible for it is impossible to imagine how a kīlaka or stake can be a container of medicine, unless it is implied as a point of support for hanging the medicine vials from it.

Dr. Heyne (1814) thus describes the ancient dispensaries of the Hindus: "The place in which medicines are kept should

¹ History of the Saracens p. 262, 1890.

² इत्यादिकलकम्भुविनसनेपत्रे
पश्चात्यादिशिष्ठैर्मिष्टते ॥

Suśruta Samhitā. I. xxxvii.

³ स्तहीतीषधसंस्थापनीपाये दर्शयन्नाहः—इति ति । ग्रीतः कर्षटखण्डः, चदा भास्तः, चतुभास्तः । फैलक' पहक' इति पुक्कान्तरे पाठः, शहुः कौलकः, एतेषु इतादिषु विनसने
इत्ते भेषजे' यथिन् स्तहे तत् भेषजामार्दं भेषजम्भुमिष्टते इति सन्धनः । प्रशस्तायां दिशि
पूर्वस्थामुत्तरस्थाया वा, युच्ची देशे अथिन् भूमिप्रविभागीयायाये, निकन्तेषु अल्लयेन न पाठी
हम्मते । अस्याभिमृष्टु हत्तकमरीदेव पाठी लिखित इति सर्वोदयवसायेविलादि यावद्वयं
द्रव्यं पुराणचेति पाठ केचिदाचार्या न पठन्ति ॥

be clean, dry, and not accessible to rats, white ants or dust. The drugs ought to be put in nets, or large pots, the mouth of which must be tied over with a piece of cloth, and suspended in a room. Fire, smoke and water must be kept at a distance.

The house in which medicines are stored, should be neither in too high nor too low a situation, and it should not be far distant from places in which medicines may be collected. Its front should face either the south or the north, with a convenient *viranda* before the door of the same side.

The necessary apparatus for mortars, scales, &c., must be kept in a place in the wall that has been consecrated for that purpose by religious ceremonies."

After describing the different classes, and members composing each class, of medicines, Suśruta continues: "The wise physician should collect and classify these medicines, and with them prepare external applications, infusions, oils, ghee, syrups, &c., as required for derangement of a particular humour. The medicines should be carefully preserved in all seasons, in rooms free from smoke, rain, wind and dust. The medicines should be used singly, or in combinations of several medicines of a class, or of an entire group, or of more than one group, according to the nature of the disease, and the extent of derangement of the humours."¹

¹ एभिलेपान् कपायोऽत्र तेजे सर्पीं विपानकान् ।
प्रविभव्य यथान्वार्यं कुर्वीत मतिमान् भिषक् ॥
धूमवर्धनिलक्ष्मेदैः सर्वसुचनभिद्वते ।
याहयिता रहे नवदेविविनोष्ठसंयहं ॥
समोद्द्व दीप्तमेदाश्च गणान् भिदान् प्रवीजयेत् ।
एषज्ञियाश्च समक्षान् वा मध्यं वा व्यस्तसहते ॥

ANÆSTHETICS.

In the medical text books of the Hindus, there is no mention of a general anaesthetic, from which we can infer that it was unknown in those ancient days. There are, however, many indications to show that the earlier surgeons felt the necessity of such an agent to produce insensibility to pain. Both Caraka and Suśruta mention the use of wine to produce the desired effect. Caraka says: "After extraction of a dead foetus before the full term of pregnancy, wine should be prescribed to her, for that will improve the condition of her uterus, make her happy and alleviate the pain of the operation."¹ Suśruta, however, distinctly lays down that "wine should be used before operation to produce insensibility to pain." He again remarks: "It is desirable that the patient should be fed before being operated on. Those who are addicted to drink and those who cannot bear pain, should be made to drink some strong beverage. The patient, who has been fed, does not faint, and he who is rendered intoxicated, does not feel the pain of the operation."²

The use of certain drugs to produce anaesthetic effects was well known to the ancient Greeks and Romans. Dioscorides

¹ व्यपगतमभिश्चलानु लियमामगमी सुरामौचनरिद्धमधुमदिरासवानामन्त्रमसये
सामधेतः पाथयेत गर्भकोहविशुद्धयंमत्तिविषमरक्षाणेऽपदर्पनाध्यज ॥

Caraka Saṁhitā, IV, viii.

² प्राक्शस्तकन्वाशेष्ट भोजयेदातुरं भिषक् ।
सदापे पाथयेन्नावै तीक्ष्णं योद्देदनासः ॥
न मूर्छ्यत्वद्वसंदीगामतः शस्त्रं न बुधते ।
तथादवश्यं भोक्तव्यं रोगेषुत्तेषु कर्मनि ॥
प्राणी राघवलरी नृणां वात्प्राप्त्यगुच्छान्वितः ।
धारयत्विरीषेन शरीरं पाचमीतिकं ॥

Suśruta Saṁhitā, I, xvii.

mentions Mandragora (*Mandragora Atropa*) to have been employed internally as a hypnotic and anaesthetic. Pliny (32-79 A.D.) in his Natural History mentions that this anaesthetic was also used by inhalation; and this fact is corroborated by Galen, Aræteus, Celsus and others. The Arabian physicians also used it. The Chinese surgeons still use some powder (Indian hemp probably) to throw their patients into profound sleep. In the 13th century Theodoric (died 1298) described the "spongio somnifera" the vapours raised from which were capable, when inhaled, of setting patients into an anaesthetic sleep, thus inducing insensibility to the agony and torture of a surgeon's knife. Baptista also mentions his "Pomum somniferum", to be made with mandragora, opium, &c. The Hindus also inhaled the fumes of burning Indian hemp as an anaesthetic at a period of great antiquity. As early as 927, A. D., they also knew drugs which they employed for the same purpose, for Pandit Vallala, in his *Bhoja Prabandha*, alludes to a cranial operation performed on the King Bhoja after he was rendered insensible by some drug called Sammohini (producer of unconsciousness). Another drug is also mentioned, Sañjibani (restorer to life), by which he soon regained consciousness after the operation had been finished.¹

¹ वत्सापि राजान् मोहयेन मोहयिला शिरःकपातमादाय तत्करीटिकामुटे लिंगं अकरकुलं प्रहोत्वा कर्विष्याजने निचिप्य सम्बानकरण्या कपाले यथावदरच्छ्य सम्भौवन्ना च तं जीविला तस्यै तद्दर्शवताम्।

CHAPTER III.

MATERIALS OF INSTRUMENTS.

IRON AND STEEL.

In the R̄gveda, *ayas*, (Latin *aes*), next to gold, is the metal most often referred to. *Ayas* often stands as a generic name to mean simply "metal," though in later works it signifies iron as a rule. The mention of dark and red *ayas* in the Atharva-veda indicates a distinction between iron and copper or bronze. The surgical instruments of the Hindus are recommended generally to be made of iron; but Safruta allows other suitable material when iron of good quality is not available.¹ He says: "A wise surgeon should get the instruments made of pure iron and with sharp edges by an expert blacksmith who is skilful and experienced in his craft."² The use of impure iron as a material for surgical instruments, he deprecates as a defect and advises the surgeons not to rely on such instruments.

The Hindus were acquainted with steel and they knew how to turn out steel of fine quality from a pure iron ore. Nāgarjuna, the well known Buddhist chemist, wrote a scientific

¹ सानि प्रावश्ची लौहानि भवनि तत्प्रतिष्ठपकाणि वा तद्वामे।

Safruta Samhita. I. vii.

² अस्त्राशेतानि भवनान् यज्ञशेकायसानि तु।
कारयेत् करणेः प्राप्तं कन्दारं कर्माणोविदं ॥

Ibid. I. viii.

treatise on steel and iron.¹ Śibodāsa in his commentary on Chakrapāṇi quotes Patañjali as an authority on the subject.² In the Dhanurveda, Viracintāmaṇi, Śāraṅgadharapaddhati and Lohārnava, steel as a material of sword has been described and classified.

Dr. Mitra quotes some references³ about the knowledge of iron possessed by the ancient Hindus from the R̄gveda. He finds that "swords (II. 156), spears (IV. 25), javelins (II. 292), lances (I. 774), (IV. II. 288) and hatchets (I. 120) are frequently mentioned; and these weapons were bright as "gold" or golden (IV. 19), "shining bright" (I. 175), "blazing" (IV. 93), "sharp" (IV. 113) and "made of iron" (I. 226); they are "whetted on a grind stone (II. 36) to improve their keenness (I. 150), and "polished to enhance their brightness" (II. 326). According to Nearchus, King Porus gave 30 lbs of steel to Alexander as the most precious present he could offer."

Royle also remarks⁴: "Working in metals they have long been famous for: their steel acquired so great celebrity at an

¹ नामाच्युनी मुभैद्र भग्नास वहोऽशास्त्रमतिगहनम्।
तस्यार्द्धस्य अृतये वयमेतदिशदाचरेत्वमः॥

Cakradatta, Rasīyanādhikāra.

² चर्चयिला विधानेन हेरन्व शुक्रमात्करी।
लीकपालान् यहायेव देवपालान्दीपवधम्।
आदिवदेवतायेहा भन्वतरोपतप्तलो
दद्यादविष्व सञ्ज्ञ्यो नानामर्चोपचारतः॥

Quoted in Śibodas's commentary on Louhamārana-
Vidhi in Cakradatta.

³ Dr. R. L. Mitra's Indo-Aryans, Vol. I, P. 301. See Wilson's R̄gveda.
⁴ Royle's Antiquity of Hindoo Medicine. Pp. 46-7.

early period, as to have passed into a proverb among the Persians, where *fouladee hind* indicates steel of the best quality; and *juwabee hind*, an Indian answer, means a cut with a sword made of Indian steel."

COPPER.

Pure copper was also used as a material of instruments; and vessels and instruments of copper are frequently mentioned in the medical books of the Hindus. A copper probe for applying antimony to the eye has been found in the excavations of Bijnor and another in the Bihat excavations. Cakradatta¹ advises us to use a copper probe for the application of *lekhana* collyrium; and Suśruta mentions a copper needle in the operation for re-clination of cataract.²

TIN.

Tin was also used as a material of blunt instruments. Suśruta mentions plates of tin to surround a tumour and to protect the healthy parts, before the application of actual cautery.³ Such plates are recommended to be made of tin, or lead, or copper, or iron.

LEAD.

Tubes of lead were used for purpose of fumigation. Probes made of lead were used for application of collyrium. The use

¹ प्रशस्ता लेखने ताम्री रोपने वालवीहजा।

Cakradatta, Añjanadhiikāra.

² ताम्रायसौ श्रातकौ श्री श्वाका स्यादनिन्दिता।

Suśruta Saṁhitā, VI. xvii.

³ अत्यावगिटे हनिभि इति च लिंगेतसीऽपि विदधौत पशात्।

यदत्यमूलं वपुतामसीस पदः समावेष तदायसेव्ये।

चारापिशक्षात्य सहादविदध्यात् प्रानाष्विसनं भिवरप्तमतः॥

Suśruta Saṁhitā, IV. xviii.

of lead plates to surround tumours before application of actual cautery has been noted above.

BELL-METAL.

The use of bell-metal—an amalgam of zinc or tin and copper, 25 parts of the former with 75 parts of the latter,—as a material of probes for applying collyrium, is mentioned by Suśruta.¹

GOLD AND SILVER.

Gold was known to the Hindus from the remote antiquity; and among the metals, it is the one most frequently² mentioned in the R̄gveda. Silver was perhaps unknown during the earlier Vedic age, from its name being not mentioned in the R̄gveda. But no conclusion can safely be drawn from this argument³. We find, however, gold, silver, and other precious

¹ सौवर्णं राजतं शाह्नामं वेदूष्यकासुखं
चायसानि च योजानि शलाकाय यथाकरम् ॥

Suśruta Saṃhitā, VI. xviii.

² "निष्ठ रीव"

R̄gveda. 5 Mandala. 19 Sūkta.

"निष्ठेन मुद्रयेऽन असदृता रीवा" ।

Sāyana.

अथः न हेत्यावान् ।

Ibid. 4 Mandala. 2 Sūkta.

"हृष्ट निष्ठित कद्यावान् अथः" ।

Sāyana.

"A horse with golden caparisons"—Wilson.

³ "एनो रथि" ।

R̄gveda. 5 Mandala. 33 Sūkta.

एनवर्णा वेतवर्णा रथि धनं ।

Sāyana.

"Query, if silver money be intended"—Wilson.

stones mentioned as materials of instruments in the medical books. Gold and silver vessels and plates are often described in Sanskrit literature.¹ Suśruta mentions the use of drinking cups made of gold, silver and precious stones.²

Caraka, amongst other things necessary for a lying-in-room, mentions two needles of gold and silver.³ To cut the navel-cord of the new-born child, he recommends a knife made of gold, or silver, or iron.⁴ In the *Manusamhitā*⁵ we find: "Before the section of the navel string, a ceremony is ordained on the birth of a male; he must be made while sacred texts are pronounced, to taste a little honey and clarified butter from a golden spoon."⁶ A golden needle is mentioned by

¹ सुवर्णकम्बलाम् यज्ञि रद्व मयानि च ।
कौस्थाय काय रैख्यानि एपुसीस नयानि च ।
निर्लेपानि विशुद्धात्रिं केदलेन जलेन तु ॥

इति ब्राह्मे ।

² सौवर्णे राजते तामे कासेर् मणिमये तथा
पुष्पावतंस् भौमि वा सुगन्धि सत्तिलं पिवेत् ॥

Suśruta Samhitā, I. xliv.

³ * * * दीक्षी सूचोपिच्यत्कौं सौवर्णराजती दे ग्रसाति च दीक्षायसानि ।

Caraka Samhitā, IV. viii.

⁴ नाभिवर्धनात् प्रभति हित्वादाकुलमन्तिरान् कृता छेदनादकाशसा इवीष्टनरथीः
अनेद्य छीत्वा तीक्ष्णेन रौक्षराजतायसाना देदनानामन्तमेनोद्धारिन केदयेत् ॥

Ibid.

⁵ प्राक् नाभिवर्धनात्पुंसो जातकर्म विद्वैषते ।
मनवप्राग्नन् चास्य हिरञ्जामधुसर्पिषाम् ॥

Manusamhitā, II. 29.

⁶ Manusamhitā (ch. II. V. 29, Jones's trans.)

Suśruta for pricking the bulb of Soma plant to extract its juice.¹ To cure trichiasis, Cakradatta mentions a needle cautery of gold.² For destroying the hair follicles, he advises us to pass the hot needle into them as soon as the eyelashes are removed by epilation. In the Yogaratnākara, is mentioned a cautery of gold, to burn the fistulous track round the anus.³ Śārigadhara mentions silver or coral pots for keeping medicated snuffs,⁴ and gold and silver tubs for immersing patients in medicated lotions.⁵

HORN.

Horns of animals are mentioned as suction-apparatus. For

¹ * * * * सौमकन्दं सुवर्णसूचादिविदायं पयोद्यक्तोयात् सौवर्णं पात्रेऽङ्गलिमान् * * *

Suśrata Saṃhitā, IV. xxix.

² प्रवहालन्मुखं रीम सक्षिक्षीकरणरचनैः ।
सम्भृतेनोत्तरेहस्यां पथरोमात्रि इहिमान् ।
रक्षश्चिद् दहेत् पक्षं तदहेमशत्राकया ।
पक्षरोगे पुनर्मैव कदाचिद्द्रोमसञ्चयः ॥

Cakradatta, Netraroga Cikitsā.

³ अपानमार्गपिटिको दहेत् लत्यशत्राकया ।
अद्विष्टसया पवात् कुर्वद्यिवरकियाम् ॥

Yogaratnākara, p. 347.
(Anandāśram Series).

⁴ कीचमच्छिप्तधारणे हेमतारादिशुक्तिभिः ।
गुला वा पात्रे चुक्ता वा इतैवा नस्यमाचरेत् ॥

Śārigadhara Saṅgraha, III. viii.

⁵ सौवर्णं राजतं वापि ताम्रमायसवदाक्षं ।
कीरके तत्र कुर्वतीच्छादे पठिष्ठदद्रुतं ॥

Ibid, III. ii.

this purpose, the horn of a cow is recommended.¹ A probe made of horn is advised to be used for applying collyrium. Suśruta mentions goat's horn to be used as a container of medicine.² He also recommends for this purpose vessels manufactured out of horn.³ Similarly Caraka advises us to keep medicines in the lamb's horn.⁴ Tubes of Vasti-yantra (clysters) are often described to be made of horn.⁵

BONE AND IVORY.

Vāgbhaṭa II describes the aṅguli-trāṇaka or finger-guard to be made either of wood or ivory.⁶

¹ “नुपर्णे”, विष पूयादा चूषन् निमित्तं शरीरेषु सुज्यते यत्, “शङ्क” गवादि भवे गुदिर् शङ्कः * * * *

Vāgbhatārtha Kaumudi, I. xxv.

² चुम्हास्त्रन् कारविला भाजने मेषशङ्कनि ॥

संस्थाप्यीभवतः कालमङ्गयेत् सुरक्षा चुधः ।

Suśruta Saṃhitā, VI. xv.

वंशि वा नाहिये शङ्के स्थापयेत् शोधिये रसम् ।

Rasendra Cintāmaṇi, IX.

³ एतचूर्णास्त्रन् चेत्त निहितं भाजने शमे ।

दनास्त्रटिकवैदूष्यं शङ्कमेलासगोहवे ।

शातकुम्भेऽय शङ्कः वा राजते वा सुसंखते ॥

Suśruta Saṃhitā, VI. xix.

⁴ सिंहः शेषासने भाष्टे मेषशङ्के च संस्थितः ॥

Caraka Saṃhitā, VI. xxvi.

⁵ विमुद्रासे लिखचाच धारुजो काठजो तथा ।

यहुलौस्या गोपुच्छा नाडो युद्धात् दिहितिको ॥

Sārīrgadhara Saṃgraha, III. ii.

⁶ अद्वलि वाणकं दानं वाचं वा चतुराङ्गं ।

Aṣṭāṅga Hṛdaya, I. XXV.

WOOD.

To apply vapour-bath, Śāṅgadhara mentions tubes made of wood or metal.¹ Wooden Tubes for injections were also used.²

STONE.

Śāṅgadhara says: "The collyrium probes should be made either of stone or metal".³ For compounding medicines, stone *khal* or mortar and pestles are mentioned. A big stone slab with a muller is recommended to be used for grinding dry or fresh vegetable medicines. In extracting the Soma juice, two slabs of stone are mentioned in the R̄gveda.⁴

EXECUTION.

The execution of the instruments is said to have been all that can be desired. Suśruta says⁵: "They should be made just of the proper size with their ends rough or polished; they should be also strong, well-shaped and capable of a firm grasp." Again he continues: "When an instrument (has been selected) of

¹ नेत्रानि धातुजान्वाहनेत् वंशादिजान्वयि ॥

Śāṅgadhara Saṅgraha, III. ix.

² नेत्रं कार्यं सूबादिधातुभित्तचवेशभिः ।
नलेष्टेदिधातुर्यादेः मणिभिर्विदीपते ॥

Ibid, III. v.

³ मुखयोः कुर्णिता द्रुक्षा शलाकावाहुलोन्मिता ।
अमज्जा धातुजा वा सात् कलायपरिमल्ला ॥

Ibid, III. xiii.

⁴ R̄gveda, 10 Mandala, 76, 94 & 175 Sūktas.

⁵ समाहितानि यन्नाशि स्वरद्वजसुखानि च ।
सुहृदानि सुखपापि सुखापि च कारवीत् ॥

Suśruta Saṅkhita, I. vii.

a fine make and with an edge keen enough to divide the hairs on the skin, and when it has been firmly grasped at the proper place, only then it should be used in any surgical operation"¹. And again : "A wise surgeon will get his instruments made of good iron and with sharp edges, by a blacksmith who is skilful and experienced in his craft."² Vāgbhaṭa also gives the same directions.³

ORNAMENTATION.

In the absence of actual specimen, it is impossible to say whether there was any ornamentation on the surgical instruments of the Hindus. No ornamentation is described in the extant medical treatises. Only one instrument—*Mucutī*—is mentioned by Vāgbhaṭa II as being ornamented with a ring.⁴

EDGES OF SHARP INSTRUMENTS.

Suśruta says⁵ : "The edges of instruments, used in incising

¹ यदा सुनिश्चितं ग्रस्तं रोमच्छेदि सुरक्षितं ।

सुरक्षितं प्रमाणेन तदा कर्त्तव्यं योजयेत् ॥

Ibid, L viii.

² See foot-note 2, P. 61.

³ वह्निशितः सुकर्म्मरैष्टितानि यथाविधिः ।

शक्तात्त्वं रोमवाहीनि बाहुल्येनाहुलानि यट् ॥

सुरपाणि सुधाराणि सुरक्षाणि च कारयेत् ।

अकरालानि सुभात्सुतीकावार्ततेऽयसि ॥

समाहितसुखापाणि नीलाष्टोजच्छवीनि च ।

नामानुगतस्पाणि सदा सन्निशितानि च ॥

Aṣṭāṅga Hṛdaya, I. xxv.

⁴ सुवृट्टी सूक्ष्म दन्तकुर्म्मले दत्तकसूपशा ।

Ibid.

⁵ तत्पात्रा भेदनानां मात्रौ । लिखनानामात्रमात्रौ ।

व्यष्टनानां विचारणानाथ कैश्चिकोति । वेदनानामहौकैश्चिकोति ॥

Suśruta Saṃhitā, I. viii.

(as of Vṛddhipatra, Nakhaśastra, &c.) should be of the fineness of a masūra (Ervum Lens); of those used in scarifying (as Maṇḍalāgra &c.) of a half a masūra; of those used in puncturing (as Kuṭhārikū) and evacuating (as needles, kuśapatra, &c.) of a hair; and those used in dividing (as Vṛddhipatra), of half a hair". As to the Vajīṣa or hook and the Dantaśāruku or tooth-scalers, the former should have a curved end and a fine point, while the latter should have an end shaped like the first leaf of barley."¹

THE TEMPERING OF SHARP INSTRUMENTS.

Suśruta remarks² that "the instruments are tempered in three ways;—by immersing the heated śastra in an alkaline solution, or water, or oil. Those tempered in an alkaline solution are used in dividing bones and in excising arrows and other foreign bodies. Those tempered in water are used in incising, dividing or clearing muscles; and those tempered in oil are used in puncturing veins and dividing nerves and tendons."

As the methods of tempering the śastras are the same as those recommended for the arms of war, we quote from Vṛddha Śāragadhara (the elder), two methods of tempering arrow-heads and swords. He says³: "I shall describe the ways of tempering arrow-heads, by smearing them with a paste of

¹ विशेष दनश्च त्रयानताये तीक्ष्णकच्छकप्रदम वैवपद्मुखे ।

Suśruta Sushhita, I. viii.

² तेषां पाथना चिविधा चारोदकतेलेषु तत्र चारपायितं शरणलाभिष्ठेदनेषु । चद्वकपायितम् मासक्षेदनभेदनपाटमेषु तेलपायितं सिरावधनसामुच्छेदनेषु ।

³ फलस्या पाथने इत्येव बनौषधिविक्षिपने ।

Ibid.

हन दुर्भेद्यवर्धाणि भेदयेत् तत्पर्यवत् ॥

Vṛddhya Śāragadhara,

vegetable drugs, which would thus acquire the power of piercing a coat-of-mail as easily as the leaf of a tree."

I.

"Make a paste of Pippali (Piper Longum), rock-salt and Kuṣṭha (Saussurea Lappa) with cow's urine. These are to be well mixed until the paste becomes cold and yellow. The arrow-heads and other sharp cutting instruments are to be well smeared with that paste and then heated to redness. Then they are to be removed from the furnace and allowed to cool down to a state short of redness and dipped in oil. By this means, the iron acquires special power as a cutting instrument¹".

II.

"Make a paste of the five kinds of salts,² mustard and honey. Let the instrument-maker smear it on the ūstras which are then to be heated in a furnace. When the colours resembling those of a peacock's feather³ are displayed on the ūstra, the burning is known to be adequate. The instrument is then dipped in water⁴".

¹ पिपली सैखव कुट्ठ गोमूरेन तु पेषयेत् ।
अतिशीत मनाविहं पीते नट तथौषधम् ॥
अनेन लेपयेद्भक्त्वा लिङ्गं चाप्तो प्रतापयेत् ।
ततो निर्बापितं तेले जौहं तत्र विशिष्यते ॥

Vriddhya Śāringadbara.

² सौखर्चलं सैखवस विहमीहिदमेव च ।
सामुद्रेन सहैतानि पश्चस्तुत्ववानि च ॥

³ पश्चभिर्लवणैः पिट्ट मधुसिक्तः सकर्पयैः ।
एभिः प्रतिपद्यत्वासां लिङ्गं चाप्तो प्रतापयेत् ॥
शिखिदौवानुवर्णामें तत्परीतं तथौषधं ।
तत्परं विभक्ते तीर्थं पापयेद्वक्त्वमुत्तमम् ॥

Vaidyaka.

Vriddhya Śāringadbara.

III.

The sage Uṣanās or Śukrācāryya thus describes¹ the tempering of swords in the Vṝhat Saṁhitā (Kern's trans. Ch. L.) :—

23. The fluid to imbrue a sword with, according to the precepts of Uṣanās, is: blood, if one wishes for a splendid fortune; ghee, if one is desirous to have a virtuous son; water, if one is longing for inexhaustible wealth.

24. An approved mixture to imbrue the sword with, in case of one desirous to attain his object by wicked means, is: milk from a mare, a camel and an elephant. A mixture of fish bile, deer-milk, horse-milk, and goat-milk, blended with toddy, will make the sword fit to cut an elephant's trunk.

25. A sword first rubbed with oil, and then imbrued with an unguent compounded of the milky juice of the Calotropis, goat's horn, ink, dung from doves and mice, and afterwards whetted, is fit for piercing stone.

¹ वङ्गीइकरेकदुधपानं
यदिपनिन् समौहतेऽवसिद्धि ।
भ्रष्टपिण्डमृगाय वसदुर्घ्यः
करिहतच्छिदये सतालगम्भे ॥
आकं पदो तुहु विषाणुमसीमन्ते
पारवताम्तु शक्ता च युते प्रलेप ।
ग्रस्तस्य तैलसयितस्य ततोऽस्य पानं
पश्चाच्छितस्य न जिकासु भवेदिधातः ॥
चारि कदल्ला मधितेन युते
दिनोविते पायितमायसे यत् ।
सम्बक् जित् खाग्नि नैति भद्रं
न चान्वनीहेष्यि तस्य कौण्ड्यम् ॥

26. An instrument imbrued with a stale mixture of potash of plantains with butter milk, and properly whetted, will not get crooked on a stone, nor blunted on other iron instruments.

GOOD AND BAD QUALITIES OF SURGICAL INSTRUMENTS.

Suśruta says¹: "The good points in an instrument are the following : it should have a well-made handle, affording a firm grasp ; it should be made of iron of good quality ; it should have a fine edge, a pleasant shape and a well-finished point ; and it should not be dentated (except the saw)." He gives preference to the Śastras which are of good make and with a fine edge—so fine as to divide the hairs on the skin and whose handles can easily be grasped by the surgeon's hand.

On the other hand, he points out eight defects² of sharp instruments : they must not be bent, or blunt, or broken, or jagged, or too thick, or too thin, or too long, or too short. Instruments free from these defects should be used. The Karapatra or saw is the only exception, for being used for sawing bones, it requires a jagged or dentated edge. Vāgbhaṭa also mentions these defects.³

¹ तानि सुयहाणि सुकोइाणि सुधाराणि सुव्याप्ति सुसमाहिवसुद्धायच्छकराणानि चेति शस्त्रसम्पत् ।

Suśruta Saṃhitā, I. viii.

² तत्र वज्रं कुण्डं खण्डं खरधारं मतिलूलमत्यसमतिदीर्घं मतिलूलमिलादी शस्त्रदोषाः । अतीतिपरोत्तमाददीतान्धव करपचान्दि खरधारमस्मिन्देदनाथे ।

Ibid.

³ कुण्ड-खण्ड-तनु-स्फूल-डस्स-दीर्घल-वज्रताः । शस्त्राणां खरधारलमटी दोषाः प्रकौर्तिताः ॥

Aṣṭāṅga Hṛdaya, I. xxvi.

Suśruta enumerates twelve defects¹ of blunt instruments, viz., it may be too thick, or made of impure metal, or too long, or too short, or incapable of being grasped, or capable of being grasped (unevenly) partially, or bent, or made of too soft material, or of elevated ends, or it may have bent, loose, elevated, and weak pins, or be of weak ends, or of thin sides. These faults refer principally to the *Swastika yantra* or the cruciform instruments.

THE USES OF INSTRUMENTS.

Twenty four different kinds of operations² are said to be performed by the blunt instruments (Suśruta), viz.:—

1. Nirghātana	... Extraction by moving to and fro. e. g. śalyanirghātāti.
2. Pūraṇa ...	... Filling the bladder or eyes with oil.
3. Bandhana ...	... Bandaging and binding by rope.
4. Vyūhana ...	... 1. Raising up and incising a part for removing a thorn or 2. bringing together the lips of the wound.
5. Vartana ...	... Contracting or curling up.

¹ तथातिभूतमसारमतिदीर्घमतिइच्छमयाहिविषमयाहि वज्रं शिखिलमनुग्रहं सदुकीलं सदुमुखं सदुपाशनिति दादम् यत्कदीप्तः।

Suśruta Saṃhitā, I. vii.

² यत्कक्षानितु निर्धातनपूरणवन्मनव्युक्तवर्तनवात्मविवर्तनविवरणपोक्तनमार्गविशेषनविकर्षयाहरव्याप्तिनीज्ञमनविवरमनमन्मन्मनीज्ञदनाच्युपव्यवदारव्याप्तिकरव्याप्तिकरव्याप्तिप्रव्याप्तिप्रव्याप्तिनानि चतुर्विंशतिः।

6. Cālana ...	... 1. transferring, i.e., removing from one part to another; 2. moving a foreign body.
7. Vivartana	... Turning round.
8. Vivarana	... Exposing or opening out any part.
9. Pidana ...	... Pressing as by finger to let out pus from an abcess.
10. Mārga Viśodhana	... Clearing the canals such as the urethra, rectum &c.
11. Vikarṣana	... 1. Extraction by pulling; or 2. loosening a foreign body fixed in muscles &c.
12. Āharanā ...	... Pulling out.
13. Āñcana ...	... Pulling up.
14. ^o Unnamana	... Elevating or setting upright as the depressed cranial bones or ears.
15. Vinamana	... Depression as of the elevated ends of the fractured bone.
16. Bhañjana	... 1. Rubbing the head, ears &c.; 2. contusing a part all round before it is surgically operated on.
17. Unmathana	... Probing or stirring the track formed by an impacted foreign body.
18. Ācuṣaṇa	... Suction as of poisoned blood and milk by horns, or gourd, or mouth.

19. Eṣāṇa	... Exploring as by an earth-worm shaped probe, the direction of a sinus or the existence of a foreign body in the wound.
20. Dūraṇa	... Splitting or dividing as the head, ears &c.
21. Rjukaranya	... Straightening anything which is bent.
22. Prakṣalana	... Washing as a wound with water.
23. Pradhamana	... Blowing as powders into the nose through tubes.
24. Pramūrjana	... Rubbing out as foreign bodies from the eyes &c.

Vāgbhaṭa recognises only fifteen different kinds¹ of operations performed by the blunt instruments:- Nirghātana (moving to and fro), Unmathana (probing), Pūraṇa (filling up), Mārga Śuddhi (clearing passages), Saṁvyūhana (raising up and extracting a thorn by incision), Āharanya (pulling out), Bandhana (bandaging), Piḍana (pressing), Ācūṣāṇa (suction), Unnamana (elevation), Nāmana (depression), Cāla (movement), Bhaṅga (breaking), Vyāvartana (turning round); and Rjukaranya (straightening).

¹ निर्घातनोन्मधनं पूरणं मार्गशुद्धिं
संव्युहाद्वयं बन्धनं पीडनानि ।
आचयनोद्धमनं नामनं चालं भङ्गं
व्यावर्तनं ज्ञकरद्वानि च यत्कर्त्त्वं ॥

The śastras or cutting instruments, on the other hand, are said to perform eight kinds of surgical operations (Suśruta).¹

1. Chedana Excision or removal of a part of the body by operation as of piles.
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Instruments :—Vṛddhipatra, nakhaśastra, mudrikā,
utpalapatra, and arddhadhāra.

2. Bhedana Incision of a part, as of an abscess.
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Instruments :—The same as above.

3. Lekhana Scarification or dissection of a skin-flap; or scraping, as of Rohini i.e., surgical diseases of the throat.
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Instruments :—Maṇḍalāgra and karapatra.

4. Vedana or Vyādhanz ...	Puncturing as of veins to bleed patients by instruments having fine points.
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Instruments :—Kuṭhārikā, vr̥himukha, ārā, vetaspatra,
and sūci.

5. Eṣaṇa Probing, as of sinus and fistula by a probe.
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Instruments :—Eṣaṇī.

6. Āharanā Extraction, as of stone by the spoon or hook.
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Instruments :—Vaḍiṣa, and danta-śaṅku.

¹ तत्र शास्त्रकथां इविभः। तत्यथा। देहं मेयं क्षेरं विद्यमेयमाहाये' विचाच्य-
सीज्ञनिति।

7. Viśrāvana ... To let out pus as from a deep-seated abscess.

Instruments :—Sūci, kuśapatra, ātimukha, śarārimukha, antarmukha, trikurccaka, and eṣanī.

8. Sivana Stitching, as of the lips of a wound by needles.

Instruments :—The different kinds of sūci or needles.

Caraka mentions, however, six kinds¹ of operations :—

1. Pātana Incision, as in operation for sinus, abscess, intestinal injury, and deeply impacted foreign bodies.

2. Vyādhana Tapping or piercing, as in operations for ascites, suppurating tumour, ovarian tumour, boils &c.

पाठनं व्यचनसेव चोदनं सिपनं तथा ।
प्रीचनं सीवनसेव यज्ञविषं ब्रह्मकर्म तत् ॥
नाडीविकासः पक्षीयाक्षाद्या चतुर्दशीदरम् ।
अनाश्वास ये देशाः पाक्षात्ते तदिक्षाद्य ये ॥
दक्षोदराणि संपक्ता गुच्छाः ये ये च रक्तजाः ।
व्याघ्राः श्रीगिरीश्वराश्व दीक्षिपिङ्कादयः ॥
चदूडानान् स्थूलपर्यन्तानुत्सन्नान् कठिनान् ब्रह्मान् ।
ऋग्गः प्रश्नवधीर्मासं हिन्दनोपपादयेत् ॥
किलासानि सुकुडानि लिखेहेष्वानि दुहिमान् ॥
वातास्त्रव्ययिपिङ्काः सुकुडा रक्तमण्डलाः ।
कुडानभिहितवाऽऽश्रीश्वाय प्रक्षयेहिपू ॥
मौज्जः कुचुप्रदरायन् गन्धीर यदिपाटिनः ।
इति यज्ञविषमुहिंट ब्रह्मकर्म मनोपिभिः ॥

3. Chedana Excision, as in the operation for tumours, raised and thickened *vraṇo* or corns, and piles.
4. Lekhana Scraping, as in operation for some varieties of skin diseases.
5. Pracchana Scarifying, as in the operations for glands, boils, leprous nodules, inflammatory swellings, &c.
6. Sibana Sewing, as in the operation of laparotomy for deep seated diseases in the abdomen.

Vāgbhaṭa describes thirteen kinds¹ of operations performed by the sharp instruments :—

1. Utpatana ... Raising up by incision, as by the Nakhaśastra.
2. Pātana ... Incision as by the Vṛddhipatra.
3. Sivana ... Stitching as by the Sūci.
4. Eṣana ... Probing as by the Eṣanī.
5. Lekhana ... Scraping as by the Maṇḍalāgra.
6. Pracchana ... Scarification as by the Maṇḍalāgra.
7. Kuṭṭana ... Pricking as by the Sūci in tattooing.
8. Chedana ... Excision as by the Vṛddhipatra.

¹ उत्पात्य पात्य सीथेत्य-सिथ्य-प्रकृत्य कुट्टनम् ।

किंच मिदं वधी नन्ति यहो दाहय तत्क्रिया ॥

9. Bhedana	... Piercing as by the Sharp Eṣāṇi.
10. Vyadhana	... Tapping as by the Vetasapatra.
11. Manthana	... Churning as by the Khaja.
12. Grahaṇa	... Fixing as by the Sandarīṣa.
13. Dahana	... Burning as by the rods.

WHETSTONE.

In the R̄gveda we find the use of stones mentioned for whetting the edges of the arms of war.¹ The Hindu surgeons used a stone slab for sharpening the āastras or edged instruments.² It was of the colour of māṣa (Phaseolus Roxb.). The whetstones used by the Greeks and Romans were either the marble ointment slabs, or made of clay slate or sandy schistaceous shale.

INSTRUMENT CASES.

To preserve the edges of the cutting instruments, a case made of the wood of salmālī (*Bombax Malabaricum*) was used (*Suśruta*).³ Such cases were also manufactured of canvas, or wool, or silk, or leather. These cases—twelve *aṅguli* (i.e., fingers' breadth) long and nine *aṅguli* broad—were well sewn and

¹ See R̄gveda, Mandala. 2 Sūkta. 39 Verse 7.

"	9	"	90	"	1.
"	9	"	112	"	2.
"	10	"	53	"	9.
"	19	"	101	"	2.

² तेषां लिप्तानां च वर्जनाः मायवर्णाः ।

Suśruta Saṃhitā, I. viii.

³ धारसंस्थापनादै शाकली फलकमिति ।

consisted of compartments, lined with wool and separated by partitions for each instrument. They could be folded, closed with a rod and firmly tied by a knot.¹ The barbers of India still use similar cases for their instruments.

That the razor used to be kept in a case, we know from a passage in the Vṛhadāraṇyaka (800 to 500 B. C.) where the author says "It (the Atman) is here all-pervading down to the tips of the nail. One does not see it any more than a razor hidden in its case or fire in its receptacle".²

¹ स्यादशाहुलि विकारः सुधनो वादशाहुलः ।
चौम पहीर्ष कौषेय दुक्त्व चतु चर्णेनः ॥
विन्दस पातः सुस्थूतः सान् रीर्णालं शस्त्रकः ।
शलाका पिहितास्य च शस्त्रकोषः सुस्थैयः ॥

Aṣṭāṅga Hṛdaya, L. xxvi.

अथ शस्त्राणां सुरचनायैं शस्त्रकोष माह स्यादित्वादि । नवाहुलिविकारः नवाहुलि परिमानविकारविग्रिष्टः शस्त्रकोषः स्यात् । शस्त्रस्य कोषः शस्त्रकोषः । कोष चाप् इति चौके । तथा अस्त्रिकोष इत्यादि । तथा सुहु, घनो, निविडः सुधनः; तथा वादशाहुलः दैर्घ्ये वादशाहुल परिमानः; तथा चीमादिजः । तथा विन्दसः; यथा कमेण कृतः पाणी वस्य स विन्दसपातः । तथा सुहु, सूतः कृत सिवनः, सुस्थूतः; तथा सान्तरीर्णालशश्त्रकः । तथा शलाकयाः पिहितं स्थानितं आस्य मुखं वस्य स शलाकापिहितास्य तथा सुहु सञ्चयी, नापित भाष्ठिकवदाग्रीकरणं वस्य स सुसञ्चयः । चौमं अतसीगृहभवस्त्रं केन्द्रितं स्थानः । दुक्त्वशब्दः पहादिभिः लिभिः सञ्चयते । तेज पट्टुकूलं पाट् इति स्थानेन सूतेन निर्मितं वस्त्रं जन्मा, भिषादिलीम ताहवं वस्त्रं चौर्षं दुक्त्वलवनात् इत्यात्म वस्त्रादि । कौषेयदुक्त्वं कौषकार-कौठभव सूतेन रेत्रम् इति स्थानेन निर्मितं वस्त्रं ।

Vāgbhaṭārtha Kaumudi.

¹ Vṛhadāraṇyaka, I. iv.

Macdonell's Sanskrit Literature, p. 22.

To prove that portable cases for medicaments and instruments were in use in ancient India, we quote *in toto* from the *Mohāvāgga* some references to them.¹

BOXES FOR OINTMENTS, OINTMENT POTS, AND PORTABLE CASES.

Now at that time, the Bhikkhus used to put pulverised ointments into pots and saucers. They became sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a box for ointment".

Now at that time the *Khabbaggiya* Bhikkhus used to carry about various kinds of boxes for ointments—gold ones and silver ones. People were annoyed, murmured and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

"Various kinds of boxes for ointments, gold ones, and silver ones, are not, O Bhikkhus, to be used. Whosoever does so, is guilty of a dukkata offence. I allow, O Bhikkhus, the use of such boxes made of bone, or ivory, or horn, or of the *nala* reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of bronze, or of the centre of the chank-shell (*Sankhu-navi*)."

2. Now at that time the boxes of ointment had no lid. (The ointment) was sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

¹ *Mohāvāgga* vi. 12. (Sacred Books of the East).

"I allow you, O Bhikkhus, the use of a lid."

The lid used to fall off.

"I allow, O Bhikkhus, to fasten the lid with thread and tie it on to the box."

The boxes used to fall.

"I allow you, O Bhikkhus, to sew the boxes on with thread".

3. Now at that time the Bhikkhus used to rub ointment on with their fingers, and the eyes were hurt.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a stick or holder to put the ointment on with".

Now at that time the *Khabbaggiya* Bhikkhus used to keep various kinds of ointment-sticks—gold ones, and silver ones. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world".

They told this thing to the Blessed One.

"Various kinds of ointment-holders, O Bhikkhus, are not to be used. Whosoever does so, is guilty of a dukkata offence. I allow, O Bhikkhus, the use of ointment-holders of bone, or of ivory, or of horn, or of the nala reed, or of bambu, or of wood, or of lac, or of fruit, or of bronze, or of the chank-shell."

4. Now at that time the ointment-sticks used to fall on the ground and become rough.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a case for the ointment-sticks".

Now at that time the Bhikkhus used to carry the ointment-boxes and ointment-sticks about in their hands.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a bag to put the ointment-box in."

They had no shoulder strap.

"I allow you, O Bhikkhus, the use of a shoulder strap (by which to carry the ointment-box), or of a thread (by which to sew or tie it on)."

13.

1. Now at that time the venerable Pilindavakkha had head-ache.

"I allow, O Bhikkhus, the use of a little oil on the head".

(The disease) became no better.

"I allow, O Bhikkhus, the practice of taking up (medicine) through the nose". (See commentary on the Dhammapada, pp. 83.)

The nose ran.

"I allow, O Bhikkhus, the use of a nose-spoon" (Nathukarani).

Now at that time the *Khabbaggiya* Bhikkhus had various kinds of nose-spoons—made of gold, and of silver. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

"Various kinds of nose-spoons, O Bhikkhus, are not to be used. Whosoever does so, is guilty of dukkata offence. I allow, O Bhikkhus, the use of such nose-spoons made of bone, (&c., as in chap. 12, 1, down to :) the chank-shell.

2. The nose took up the medicament in unequal proportions.

"I allow, O Bhikkhus, the use of a double nose-spoon (yamaka-natthu-karani)."

They used to spread the drugs on a wick before they sniffed up the aroma: and their throats got burnt.

'I allow, O Bhikkhus, the use of a pipe to conduct the aroma.'

Now at that time the Khabbaggiya Bhikkhus had various kinds of pipes (&c., as in the last clauses of § 1, down to the end).

Now at that time the aroma-pipes came open: and worms got in.

'I allow, O Bhikkhus, the use of a lid to the pipes.'

Now at that time the Bhikkhus carried the pipes about in their hands.

'I allow, O Bhikkhus, the use of a bag to carry the aroma-pipes in.'

The aroma-pipes rubbed against one another.

'I allow, O Bhikkhus, the use of a double bag.'

They had no shoulder strap.

'I allow, O Bhikkhus, the use of a shoulder strap (by which to carry the double bag), or of a thread (by which to sew it on).

OPERATION TABLE.

In the examination for piles, Suśruta directs the patient to lie down on his bed or on a board¹; and in describing the operation, Vāgbhaṭa II mentions a board to be used as an operationtable.² A similar bed, as long as the distance from the top of the head to the knees of the patient, is also mentioned in the discription of the lithotomy operation.³ The use of a board as a fracture bed is also advised.

For passing the tubes of the *vasti-yantra* or clysters into the urethra in the male, the patient is recommended to sit on a stool as high as his knees (*jūnumātrūsana*).⁴

In phlebotomy, the patient is advised to sit on a stool, an aratni high⁵ (i.e. the distance between the tip of the olecranon process of the ulna to the tip of the little finger).

¹ मुक्तवलमुपवेश समूते यच्चौ देशे साधारणे व्यवे काले सूमे फलके ग्रथायां वा प्रवादिव्य-
गुदमवस्थोत्सङ्के निषष्ठपूर्वकायमुताने * * * *

Suśruta Saṃhitā, IV. vi.

² यच्चि कृतस्तद्वन् भुक्तविष्टुवमत्ययम् ।

मयने फलके वान्नरोक्तङ्के व्यापितम् ॥

Aṣṭāṅga Hṛdaya, VI. viii.

³ ततो बलवलमविकृवमाजानुसमे फलके प्रागुपवेश पुरवच तस्मीत्सङ्के निषष्ठपूर्वकाय-
मुतानमुद्रतकटीकं ।

Suśruta Saṃhitā, IV. vii.

⁴ सातस्य भूक्तभक्तस्य रसेन पयसापि वा ।

स्त्रद्विष्टुवेदस्य पौडि जानुसमे सदौ ॥

Caraka Saṃhitā, VIII. ix.

⁵ तत्र व्यधिरिरं पुक्ते प्रवादिव्यमुख्यमरबिमावीकृते उपवेश्यासने ।

Suścūta Saṃhitā, III. viii.

चरितापातपस्त्रो जानुशासनसंस्थितः ।

वदुपद्धात्रकेशान्तो जानुस्थापितकपर्णः ॥

Aṣṭāṅga Hṛdaya, I. xxvii.

KAPĀTA-SAYANA OR FRACTURE-BED.

In the treatment of fractures of the lower extremities, mention is made of the *kapāta-sayana* (*lit. door-bed*) or fracture-bed, consisting of a plank of wood resembling the panel of a door.¹ The patient is to lie down on it. The board has five rods fixed to it, to which the fractured limb is tied to prevent any movement: two on each side of the joint and one on the plantar surface of the foot. Dallapa explains it thus²: In fractures of the bones of the leg, two rods are fixed on each side of the ankle and one supports the foot; in fracture of the thigh bone, two rods are fixed on each side of the knee or hip, and one under the foot. In a double fracture of the thigh bone and bones of the

¹ अथ जडोरभग्रानां कपाटशयने हितं ।
कौलका वस्त्राद्यच पच कार्या विजनता ।
यथा न चलनं तस्य भग्रस्य किञ्चति तथा ।
सम्बेक्षयती दी दी, तस्मै चैकव कौलकः ।
चीराणां वा पृष्ठवर्णे वा वस्त्रस्वकार्योक्ताणा ।
भग्रस्यविमोचिषु विधिमेन समाचरित ॥

Suēruta Samhitā, IV. iii.

² जडोरभग्रेषु पदात् कर्मविशेषं निहिंश्वाह । अथ जडोर्लादि । जडोरभग्र-
विकितस्तमाह । भग्रानाम् कार्याभग्रानाम् । गिविधानामपीत्यपरे । कपाटशयनभग्रश्च
कार्यम् । चलनम् कपाट शयनेनैव सह देशान्तरनयनाद्यम् । आधारनृतशयनचालनाद्य-
मित्यन्ये । आधियमृतशरौरावयवचलन परिहाराद्यं कौलाः । कौलानां पद्मस्थानम् ।
जडोर्लाद्योरेकतरस्य भग्रमयेत्य तत्र जडोरभग्रे तु गुल्फसम्बेक्षयतो दी एकव तस्मै एवं पच ।
जडोरभग्रे जानुसम्बेक्षयतो दी दी । वहासम्बेक्षयतस्मै चैक इवतापि पच । उभयमड्डा-
पेचया तु सतभिरेव कौलीयनश्यम् । तथाह उभयतो वहिर्दी गुल्फयोर्दी च जानुनोः दी च
वहास्योः तस्मै चैक एवं सम । अव जडोर्लाद्योः पार्वयोर्दी दी तस्मै चैकय कौलक इति केचित्
पठनि । तद्रिवस्त्रकार्नं पठितम् । तस्मात् पठनीयम् । गवदासुशाव पातान्तरं किमपि
पठति । तस्मात्मावाच लिखितम् ।

Dallapa's Commentary, IV. iii.

leg, seven rods are required,—two on the outer side of the ankle, knee, and groin, respectively, and one under the foot. The fracture-bed is recommended to be similarly availed of in fractures and dislocations of the loin, the spinal column, the chest, and the clavicle. And this mode of treatment, he adds, may advantageously be used for the other kinds of fractures and dislocations. Vāgbhaṭa II also mentions it in the treatment of fractures¹.

Hippocrates used a similar fracture-bed for the proper treatment of fractures and dislocations. It was called Scammum Hippocratic or bench of Hippocrates. As the figures of this bench would elucidate the structure of the *kapāta-sayana*, we reproduce here three plates with their explanations given at the end of Vol. II, Genuine Works of Hippocrates (Syed. Soc.Ed.), and two plates—Scammum Hippocratis and Plinthium Nileii from the Collection De chirurgiens Grecs.

Fig. 1. The Scammum Hippocratis or Bench of Hippocrates, as represented by Andreas a Cruce (*Officina chirrugica venetiis*, 1596).

Fig. 2. The same as represented by M. Littré.

A. A board, 6 cubits long, 2 broad and 12 inches thick; not 13 as incorrectly stated by M. Littré.

B. The feet of the Axles, which are short.

¹ कटी ज़होरमयानां कपाटश्वन् हितम् ।
यन्मायं तथा कौला: पथ कार्या विवर्णनाः ॥
ज़होरेः पार्द्योर्बै तत् एकव कौलकः ।
शीखाः वा प्रठवंशे वा चक्रसाक्कायोर्ध्वाः ॥

CC. Axle-trees.

DD. Grooves 3 inches deep, 3 broad, separated from one another by 4 inches.

E. A small post or pillar, fastened in the middle of the machine in a quadrangular hole.

F. Pillars a foot long.

G. A cross-beam laid on the pillars FF, which can be placed at different heights by means of holes in the pillars.

Fig. 3. Representation of the mode of reducing dislocation of the thigh outwards, as given by M. Littré (*Œuv. d'Hipp.*, tom. iv, p. 305).

A mistake in the figure given by M. Littré is here corrected.

A. A lever applied to the nates of the luxated side, and acting from without inwards, in order to bring the head of the bone into its cavity.

B. Another lever, held by an assistant, put into one of the grooves of the machine, and intended to act against lever A.

C. Grove in which the end of the lever A takes its point of support.

D. The luxated member.

EE. Extension and counter-extension.

Fig. 4. Banc d'Hippocrate, d'après Rufus, servant à réduire différentes luxations. (*Collection De Chirurgiens Grecs, Bibliothèque Nationale*).

Fig. 5. Plinthium, ou cadre de Nilenus, d'après Héliodore. (*Ibid.*)

CHAPTER IV.

THE NUMBER OF SURGICAL INSTRUMENTS.

The armamentarium of the Hindu surgeons consisted of a good number of surgical instruments. They are described to be of two kinds, the *yantras* and the *sastras*, i.e., the blunt and the sharp instruments. Suśruta enumerates no less than one hundred and one varieties of the blunt instruments, and twenty different kinds of sharp instruments. Hārita, on the other hand, enumerates twelve blunt instruments, twelve sharp instruments, and four prabandhas, as necessary for the operation of extraction of arrows and other foreign bodies.¹ Vāgbhaṭa II mentions one hundred and fifteen kinds of blunt and twenty-six kinds of sharp instruments. Pālakapya (Treatment of Elephants) mentions ten kinds of *sastras* or sharp instruments though he describes the uses of other instruments required for the surgical treatment of diseases.

INSTRUMENTS AND THEIR CLASSIFICATION (SUŚRUTA.)

Of the one hundred and one varieties of the blunt instruments, the surgeon's hand is rightly considered as the principal instrument, for without its help, no instrument can properly be used, and every surgical operation is under its control.² They are recommended to be used for the extraction

¹ इदंतेव तु यन्नाणि शस्त्राणि इदंतेव तु ।

चलांति च प्रवर्भानां शस्त्रोऽपारे विनिर्दितेन् ॥

² यन्नाणतमेकीतरमत इहामेव प्रधानतर्सं यन्नाणामकवचः । किं कारणं । यथा हस्ताङ्गे यन्नाणामप्रविदिते तदधीनलादन्यकर्मणाः ।

तत्र मनः ग्रीरावाधकराणि शस्त्राणि तेवामाहरणीपाद्यी यन्नाणि ।

of *salya* or foreign bodies, e.g., a dart, an arrow, a javelin, a spear, a peg, a pin, a bamboo rod, a stake &c. which cause pain to the body and mind.

A. Suśruta subdivides the blunt instruments into six classes,¹ viz.:

I. Svastika or cruciform instruments	... 24 kinds.
II. Sandarśha or pincher-like	... 2 "
III. Tāla or picklock-like	... 2 "
IV. Nāḍī or tubular or hollow	... 20 "
V. Salākā or rod or pricker-like	... 28 "
VI. Upayantra or accessory	... 25 "

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These instruments are advised to be made generally of iron, or of other suitable materials, when iron is not available. Their ends often resemble the faces of some ferocious beasts, or of deers, or birds. Hence the instruments should be so constructed as to have the likeness of their faces, following at the same time the directions of scientific treatises, or the instructions of teachers, or in imitation of other instruments, or in adaptation to the exigencies of the time. They should be of reasonable

¹ सानि पट्टप्रकाराणि । तयदा । स्वस्तिकयन्ताणि । सन्देशयन्ताणि । तालयन्ताणि । नाडीयन्ताणि । जलाकायन्ताणि । उपयन्ताणिवेति । तत्र चतुर्विंशति स्वस्तिकयन्ताणि । हे सन्देशयन्ते । हे एव तालयन्ते । दिश्मिनाण्याः । अटविश्वाः । जलाकः । पट्टविश्वति उपयन्ताणि :

Suśruta Saṃhitā, I. vii.

Hessler translates the terms as follows: *Uncinate instrumenta, forcipum instrumenta, palmiforme instrumenta, hamata instrumenta, secundaria instrumenta,*

Hessler's Suśruta, I. vii.

size, with their ends rough or smooth as required. They should be of strong make, good shape and capable of a firm grasp.¹

I. The Svastika or Cruciform instruments are—

1. Sīhamukha. 2. Vyāghramukha. 3. Vṛkamukha.
4. Tarakṣumukha. 5. Bṛkṣamukha. 6. Dvīpimukha.
7. Mārjāramukha. 8. Śṛgālamukha. 9. Airvvārukamukha
10. Kākamukha. 11. Kañkamukha. 12. Kuraramukha.
13. Cāsamukha. 14. Bhāsamukha. 15. Śaśaghātīmukha.
16. Ulukamukha. 17. Cillimukha. 18. Gṛdhramukha.
19. Śyenamukha. 20. Krauñcamukha. 21. Bhṛūgarājāmukha.
22. Añjalikarṇamukha. 23. Avabhañjanamukha, and
24. Nandimukhamukha.

II. The Sandamīs or pincher-like instruments are—

1. Forceps with arms,
2. Forceps without arms.

¹ तानि प्रायस्त्री लौहानि भवन्ति तन्प्रतिक्षपकाणि वा तदलाभे । तथा नानाप्रकारार्थी व्याकांनां इमपञ्चिणीं मुखेमुखानि यनाणां प्रायशः सहानि तथा तन्मासक्षयादागमादुप-इश्वादन्त्ययन्दर्शनादुक्तितय कारयेत् ।

समाहितानि यकाणि खरद्रच्छमुखानि च ।

सुडानि सुरुपाणि मुखाणि च कारयेत् ॥

Safruta Saṅhitā, I. vii.

अनेकदपकाण्याणि यनाणि विविधान्तः ।

विकल्पय कल्पयेद तु द्वा यद्याकूलन्तु वलते ॥

* * * * *

अलौहान्तुशस्त्राणि तानेवद विकल्पयेत् ।

अपराण्याणि यनादीन्यपश्चीगत्य थीनिकम् ॥

Aṣṭāṅga Hṛdaya, I. xxv.

III. The Tāla or picklock-like instruments are—

1. Ekatāla.
2. Dwitāla.

IV. The Nājī or tubular instruments are—

For fistula-in-ano ... (1) with one slit; (2) with 2 slits ...	2
For piles ... (1) with one slit; (2) with 2 slits ...	2
For wounds	1
For clysters (Rectal) ... (Some authors describe 3 only) ...	4
For clysters (vaginal and urethral)... (male and female) ...	3
For Hydrocele	1
For Ascites	1
For fumigation and inhalation	3
For Urethral Stricture	1
For Rectal	1
For Cupping—gourd	1
	—
	20

V. The Salākā or rod-shaped instruments are—

Ganđūpadamukha or earth-worm like	...	2
Sarapuñkhamukha or arrow-stem like	...	2
Sarpafañamukha or snake's hood like	...	2
Vajisamukha or fish-hook like	...	2
Masūradalamukha or masūra pulse like	...	2
Promārjana or swabs	...	6
Khallamukha or spoons	...	3
Jāmvavavadana or jambul seed like	...	3
Ankuśavadana or goad like	...	3
Kolāsthidalamukha or plum seed like	...	1
Mukulāgra or bud shaped	...	1
Mālatipuśpavṛntāgra or like the stem of mālati flower	1	—

VI. The Upayantra or accessory instruments are—

1. Rajju—thread. 2. Veṇikā—twine. 3. Paṭṭa—bandages.
4. Carṇa—leather. 5. Valkala—bark of trees. 6. Latā—creepers.
7. Vastra—cloth. 8. Aṣṭhilāśma—stone or pebble.
9. Mudgara—hammer. 10. Pāṇipādatala—palm of the hand and sole of the foot. 11. Aṅguli—finger. 12. Jihvā—tongue.
13. Danta—tooth. 14. Nakha—nail. 15. Mukha—mouth.
16. Vāla—hair. 17. Aśvakāṭaka—the ring of a horse's bridle.
18. Śākhā—branch of a tree. 19. Sṭhivana—spittle.
20. Pravāhaṇa—fluxing the patient. 21. Harṣa—objects exciting happiness.
22. Ayaśkānta—a loadstone. 23. Kṣura—caustic.
24. Agni—fire. 25. Bheṣaja—medicines.

B. The sharp instruments or Sastras are—

1. Maṇḍalāgra or round headed knife.
2. Karapatra or saw (*lit.* like the human hand).
3. Vṛddhipatra (*lit.* like the leaf of vṛddhi—an unknown medicinal plant)—a razor.
4. Nakha-Sastra or nail-parer.
5. Mudrikā or finger-knife (like the last phalanx of the index finger).
6. Utpalapatra, a knife, *i.e.*, resembling the petal of a blue lotus, (*Nymphaea stellata*, Willd.).
7. Arddhadhāra or a single-edged knife.
8. Suci—needles.
9. Kuśapatra—a knife shaped like the kuśa grass (*Eragrostis Cynosuroides*).

10. Ātimukha—a knife shaped like the beak of the Āti bird (*Turdus Ginginianus*).
11. Śarari-mukha—a pair of scissors like the beaks of Śarari bird.
12. Antarmukha (*lit.* having internal sharp edge)—a kind of scissors.
13. Trikurecaka—an instrument consisting of three needles.
14. Kuṭhārikā—a small axe shaped instrument.
15. Vrihimukha—a trocar shaped like a grain of rice.
16. Arā or awl.
17. Vetasa-patraka—an instrument shaped like the leaf of a rattan (*Calamus Rotang*).
18. Vaḍīśa—an instrument shaped like the fish-hook.
19. Dantaśāṅku or tooth-pick.
20. Eṣani or sharp probe-like instrument.

According to Hārīta¹ the twelve blunt instruments are—

1. Godhāmukha or iguana-faced. 2. Vajramukha—grdhra-mukha ? 3. Tribaktra or three faced. 4. Sandamīśa or pincher.

¹ गोधामुखं वज्रमुखं चिष्ठुं नाम सन्देशवकालतिकदपादम् ।

अथानकं प्रदृक्कुरुषलयं योवत्सदौवृत्तिकं पच्चमङ्गं ।

तादेशेतानि यन्नाणि कथितानि भिषम्बट्टैः ।

अथ ग्रस्ताणि प्रोक्तानि नामानि च एषक् एषक् ।

अहं चन्द्रं त्रीहिमुखम् करपत्रं कुठारिका ।

करतीरकपत्रं ग्रस्ताककरपत्रकम् ।

वडिशं गद्धपादवं शूली च चुचिमुहरम् ।

ग्रस्ताक्षेतानि प्रोक्तानि ग्रस्तीढारे पथक् एषक् ॥

5. Cakrākṛti or circular shaped. 6. Anaka ? 7. Kañkapāda ?
 8. Śṛṅga or horn. 9. Kundala ? 10. Śribatsa ? 11. Saubatsika ?
 12. Pañcabaktram, i.e., five faced—śīhamukham ?

The twelve sharp instruments of Hārīta are—

1. Arddhacandra or half-moon shaped. 2. Vrihimukha.
 3. Kañkapatra. 4. Kuṭhārikā. 5. Karavīrakapatraka. 6. Śalākā or sharp probe. 7. Karapatraka or saw. 8. Vaḍīsa or sharp hook. 9. Grdhrapāda ? 10. Śūlī 11. Sūci or needle. 12. Mudgara or hammer ?

Vāgbhaṭa II classifies the instruments in the following way :-

A. Blunt instruments—

I. Svastika, as heron, lion, bear, crow, deer forceps &c. .... ...	... 24
II. Sandarīṣa : It consists of two iron blades soldered at one end, the other ends being free	2
(a) for extraction of eyelashes &c. ... 1	
(b) mucutī ... 1	
III. Tala	2
(a) Ekatāla 1	
(b) Dwitāla 1	
IV. Nūḍī or tubular :	23
(a) Kanṭhaśalyāvalokint or throat speculum having three and five holes ... 2	
(b) Śalyanirghātant 1	
(c) For piles, different sizes for male and female 6	
For inspection : 2 holes—rectal speculum 2	
For medication : 1 hole 2	
For applying pressure : entire—śūmi ... 2	

(d) For fistula-in-ano: with one and two holes	2
(e) For nasal polypus &c.	1
(f) Āṅguli-trāṇaka or finger-guard	1
(g) Joni-vraṇekṣaṇa or vaginal speculum ...	1
(h) Vrāṇo vastī or wound syringe	1
(i) For ḍakodara or Paracentesis abdominis	1
(j) Vastiyantra or clysters: rectal, vaginal and urethral	3
(k) For fumigation...	1
(l) Cupping instruments: Alābu, Ghaṭīyantra and Horns ...	3
	—
	23
V. Śalākā or rod-like instruments	34
(a) Gaṇḍūḍadamukha or earth-worm shaped	2
(b) Maśūradalabaktra	2
(c) Śaṅku	9
Faṇibaktra or snake's hood	2
Śarapuṇikamukha	2
Vadīṣa or blunt hook	2
Garvaśaṅku or delivery hook	1
Āsmari or lithotomy hook	1
Śarapuṇikamukha or tooth extractor	1
(d) For wiping out discharges	6
For rectum	2
For nose	2
For ears (karṇaśodhana)	2
(e) For application of actual and potential cauteries	11
Jāmvobouṣṭha, three for each	6

Arddhendu or half-moon shaped, for hernia	1
Koīasthidala for nasal polypus	1
Nail-shaped	3
(f) For cleansing	3
Rectum	1
Vagina	1
Urethra	1
(g) Collyrium probe	1
	34

VL Anuyantra or accessory instruments are nineteen in number. To the list of Suśruta he adds the following¹ :—

Goat's gut, silk, time, suppuration, and fear.

B. The sharp instruments of Vāgbhaṭa are twenty-six in number.²

1. Mandalāgra. 2. Vṛddhipatra. 3. Utpalapatra. 4. Adhyarddhadhāra. 5. Sarpasya. 6. Eṣaṇī:—Ganḍūpadamukhā and Śūci-mukhā. 7. Vetasa. 8. Śarāri. 9. Trikurccaka. 10. Kuśapatra. 11. Ātivadana. 12. Antarmukha and Arddhacandrānan. 13. Vrihibaktra. 14. Kūthāri. 15. Kuravakasalā. 16. Ānguli-śastra. 17. Vadīsa. 18. Karapatra. 19. Kartari. 20. Nakhaśastra. 21. Dantalekhana. 22. Śuci. 23. Kureca. 24. Khaja. 25. Ārā. 26. Karnavedhani.

¹ अनुयन्त्रास्त्रयक्तान् रच्य वस्त्राद्यम् सुद्धराः ।
पटान् निह्ना वालाय शास्त्रा नखू मुखू दिजाः ॥
काषः पाकः करः पादोभयं छैय तत् किंवः ।
चपायवित् प्रविभजेदालोच्च निपुणः चिया ॥

Aṣṭāṅga Hṛdaya. I. xxv.

² यह्विश्चिति: सुकमोरैर्घटितानि दथाविधि ।
ग्रन्थाणि दीभवाहीनि वाह्येनाह्यानि यष्ट ।
सुरपाणि सुधाराणि सुराहाणि च कारवेत् ।
अकरलानि सुधात् सुतीक्षावात्तंतेऽयसि ॥

Ibid. I. xxvi.

Bhāvamīśra mentions the following blunt and sharp instruments: Eṣāṇī, Jāmvousṭha Śalā,¹ Sūci² and knives generally in making incisions which should be shaped like Kharjjūrapatrika, (like the leaf of Kharjjūra tree, Phoenix Sylvesteris, Roxb.) Arddhacandra, Candravarga, Sūcimukha and Abāñmukha.³

Pālakapya⁴ mentions ten kinds of śastras :—1. Vṛddhipatra, 2. Kuśapatra. 3. Mandalāgra. 4. Vṛihimukha. 5. Kuṭhāri. 6. Vatsadanta. 7. Utpalapatra. 8. Śalākā. 9. Sūci or needles. 10. Rampaka. Besides these he refers to Vaḍīśa.

Of the blunt instruments he mentions:—Jāmvobonṣṭha—(four in number, for application of actual cauteries), Siṁhadāmṣṭrā, Godhāmukha, Kaṅkamukha, Kuliśamukha—(for extraction of foreign bodies), Eṣāṇī or probes (three), wound syringe, Vastiyantra, Śalākā or rods, yaṣṭhiyantra, Karkataka, Dyātūha, Makaraka (crocodile), Śārdḍūlamuṣṭhika (tiger's claws), Nandimukha (Turdus Gingivianus).

¹ एषाणी गतिमन्त्रिष्य चारस्त्रादुसारिनौम् ।

सूचौ निदध्यादव्यन्ते प्रोक्षाम्बाघु विनिहरेत् ॥

Bhāva Prakāśa. II. iv., Nādi Vraṇḍādhibhāra.

² आगनुजे भिषप्राङ्गो शस्त्रेचीत्क्रय यवतः ।

जान्मोहीनाप्रिवर्णेन तदया वा श्लाकया ॥

Ibid. Bhagandarśdhikāra.

³ गतिमन्त्रिष्य शस्त्रेण हिन्दात् खच्चूरपविकम् ।

चन्द्रादैं चन्द्रवर्गेच सूचौमुखमवामुखम् ॥

Ibid.

⁴ तत्र शक्ताणि दशनामसंस्थानानि भवति । तदया हङ्गिपत्रम्, कुञ्जपत्रम्, मण्डलायम्, ग्रीष्मिमुखम्, कुठाराकृति, वत्सदलम्, चतुपत्रपत्रम्, शत्रावा, सूचौ, रम्पकयेति । फालजाम्बवतापिकादर्थाकृतयेति । एताम्बापिकान्मिथाने चतारि चानानि ग्रन्थदरशानि यथादीग्मं सिद्धद्रेष्ट गोधामुखं कडमुखं कुण्डिमुखं चेति । तित्र एषिष्यतः ।

CHAPTER V.

DESCRIPTION OF THE BLUNT INSTRUMENTS.

Now we shall describe the instruments in detail. The Yantras or the blunt instruments will be considered first, and next the Śastras or the sharp instruments.

I. The Svastika yantra or Cruciform Instruments.

The word svastika is a technical term signifying one of the twenty-four signs of the Jinas; and it can be represented by two lines crossing each other, the arms of the cross being bent at their extremities towards the same direction. So these instruments may be described as cruciform. They have, as a rule, a length of eighteen anguli. Their ends should be shaped like the faces of the following ferocious beasts (1 to 8), deer (9), and birds (10 to 24), and the instruments are to be called after their names.¹ They are divided into two classes; the instruments of class I resemble the mouths of lion (śinha) and tiger (vyāgra), while class II comprises the instruments which have the likeness of the faces of birds of prey. The fulcrums of these instruments which are at the middle, are of the size of a masūra (Ervum lens). The handles are either rounded off, or bent at an angle at their ends, like an elephant driver's goad—the object being to afford a good grasp of the instrument by the surgeon's hands. The svastika instruments are used for the extraction of

¹ तत्र मन्त्रिकयनास्याददशाहुलम्भाशानि सिंहव्याघ्रकतरं च च च वीपिमाजारं अश्वालम्भै र्णाइककाककाककुरुचासभासमग्रधायस्त्रुक्तिविशेषयद्वकोषवद्वद्राजास्त्रिलिकार्यवभ्युपनन्दिमुखमुखानि नन्दालतिभिः कोषवद्वद्राजानि मूलेऽद्वद्राजासारकाण्यादिविनटश्वल्पोद्वारणाद्युपदिश्यन्ते।

foreign bodies impacted in the bones.¹ If the foreign body is visible, extract it by the lion forceps or similar forceps of class I. If it is invisible, it should be extracted by the Heron forceps or similar forceps of class II. Of all the varieties of svastika instruments, the Heron forceps (kañka-mukha) is the best, for it can be easily introduced and turned in all directions, and also it grasps firmly and extracts a foreign body with ease and can be applied without any harm to all parts of the body.²

Class I :—

1. Siñhamukha svastika or Lion-faced forceps :—this instrument is said to have its mouth shaped like that of a lion (*Felis leo*). It is the principle instrument of the class I. It is

¹ तु ल्यानि कहमिहवं काकादिस्मपचिणी ।
सुखेमुखानि यनाणो कुर्वन्त् संशकानि च ॥
अष्टादशाहृत्यामान्वायसानि च भूरिषः ।
ममूराकारपञ्चोः कहटेवद्वानि कौलकैः ॥
विद्यात् स्तक्षिक यनाणि मूलेऽद्युग्नतानि च ।
ते हृदैरविसंलग्न गत्याहरणमिथते ॥

Aṣṭāṅga Hṛdaya. I. xxv.

² हृदैर्ति सिहमुखादैत्य शृङ् कहमुखादिमिः ।
निर्दिरेत्य श्रैः श्रक्तः शास्त्रयुक्तिव्यपेचया ॥
विवर्तते साधवगाहते च श्रव्यं निरक्षीहरते च यथात् ।
यत्तेष्वतः कहमुखम् प्रधानं यानेषु सर्वेष्वधिकारि चैव ॥

Suśruta Saṃhitā I. vii.

निवर्तते साधवगाहते च
यात्ता द्यहीलोहरते च यथात् ।
यत्तेष्वतः कहमुखम् प्रधानं
स्थानेषु सर्वेष्वधिकारि चैव ॥

Aṣṭāṅga Hṛdaya. I. xxv.

curious that in modern times, the European surgeons use a pair of forceps called the Lion forceps for holding bones firmly during operations. So the Makaramukha of Pälakapya is the Crocodile forceps.

2. Vyāghramukha or Tiger forceps: the mouth of this instrument is like that of a tiger (*Tigris regalis*).
3. Vṛkamukha or Wolf forceps (*Canis lupus*).
4. Tarakṣumukha or Hyena forceps (*Hyena striata*).
5. Rkṣamukha or Bear forceps (*Ursus Americanas*).
6. Dwipimukha or Panther forceps (*Felis pardus*).
7. Mārjāramukha or Cat forceps (*Felis domestica*).
8. Śrgālamukha or Jackal forceps (*Canis aureas*).
9. Airbbāruka or Deer forceps (*Cervus elephas*).

Class II:—The birds, in imitation of whose faces the instruments of this class are made, can be identified from the following discription of their beaks.—

Birds: 1. Raptatories : they have curved beaks hooked at the extremity.

- (a) Strigidæ...owls...strong hooked beaks bent down from base.
- (b) Vulturidæ...vultures...long straight beaks bent down at tip.
- (c) Accipetridæ...falcons, osprey and eagle...short, usually dentated beaks, hooked at the ends.
2. Pessaries...(a) Lanidæ...shrike...hooked and strongly serrated beak. (b) Corvidæ...crow and blue-jay...beaks strong, thick, somewhat curved anteriorly and slightly notched.
3. Grallatories...Heroidæ or Ardeidæ...herons and krauñca...they have long and powerful beaks with sharp hard

edges, somewhat curved at the point, rarely spoon-shaped, with long neck.

The instruments are—

10. Kākamukha or Crow forceps (*Corvus corone*).
11. Kaūkamukha or Heron forceps (*Ardea cenerea*).
12. Kuraramukha or Osprey forceps (*Pandion haliaetus*).
13. Cāsamukha or Blue-jay forceps (*Garrulous* or *Corvus cristatus*).
14. Bhāsamukha or Eagle forceps.
15. Śāsaghātimukha or Hawk forceps (*Nanclerus furcatus*).
16. Ulukamukha or Owl forceps (*Strix flammea*).
17. Cillimukha or Kite forceps (*Milivus ietimus*).
18. Śyenamukha or Vulture forceps (*Vulture cinereas*).
19. Grdhramukha or Falcon forceps (*Peregrine falcon*).
20. Krauñcamukha (*Ardea jaculator*); or Curlew (*Numenius Arquatus*). *
21. Bhṛṅgarājamukha or Fork-tailed or Butcher-bird forceps (*Lanius excubitor*).
22. Añjalikarṇamukha—birds not identified.
23. Avabhañjanamukha " " "
24. Nandimukhamukha (*Turdus Ginginianus*).

II. The Sandamā or Pincher-like Forceps.

The second class of instruments—the Sandamā¹ or pincher-like forceps—comprises only two instruments: the forceps with and without handles. The first variety is likened

¹ सनियहीऽनियहय सन्दमो षोडशाहृत्वो भवतस्तमासुसिराचादुगतश्लोहारणार्थं मुपदिश्यते ।

to forceps with arms, used by the barbers for depilating the nasal cavities, while the second variety is like the armless forceps used by the goldsmiths. The former consists of two arms joined crosswise by a pin fixed at about their middle points, and so really is a cruciform instrument but is classed here for its different use in surgery. The forceps without handles consists of two blades soldered at one end. Some commentators like to subdivide the pinchers into two classes according as their ends are rough or smooth. And so Hessler translates:¹ "Duae forcipes denticulata et non denticulata".

The sandāṁśas are used for the purpose of extracting foreign substances from the soft structures of the human body, such as the skin, muscles, veins, nerves, and tendons². Generally they have a length of sixteen aṅguli.

Vāgbhaṭa II mentions two other instruments as modifications of the type :—

(a) One variety has the length of six aṅguli. It is intended for the purpose of extracting minute foreign bodies such as thorn, hair &c. and of removing the superfluous eyelashes.³

Cakrapāṇi also advises us to use a sandāṁśa for epilation, which may be called the Epilation forceps.⁴

¹ Hessler's Suśruta. Caput vii. P. 14.

² कोलवद्व विमुकादौ सन्देशौ पोडभाष्टौ ।
तकसिराचायुपिण्ठि लघु ग्रस्यपकर्त्ते ॥ ५ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

चतिगुम्ब ग्रस्यव सन्देशै समुद्दिर्तु ।

Hariṭa Saṁhitā, III. lvi.

³ वडहुलीबोहरणै सूज शख्ती पपद्धता ॥ ६ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

* See foot-note 2, p. 66.

complete the operation for pterygium by removing the remnant, after it has been extirpated by the sharp instruments. Suśruta calls it Mucundi¹, and uses it to hold the pterygium after it has been raised by vadīṣa or hook. It must be then a smaller variety of mucuti.

A similar pair of forceps, Dr. Erichsen mentions, and says² that "for the purpose of extracting needles, thorns, splinters of wood and other foreign bodies of small size and pointed shape lying in narrow wounds, forceps with very fine but strong, well-serrated points will be found useful."

Suśruta mentions barnabidala³ or bamboo forceps. It is made of a piece of bamboo rod, split longitudinally into two halves nearly to its whole extent. This is like the bamboo tongs used by the smokers in Bengal to raise glowing charcoal to the earthen bowl. It should be used to remove worms from the surface of the human body.

The sandāṁśa instrument may be compared with the modern dressing forceps and with the forceps still used by the goldsmiths, known as a sonnā. Those with arms have their counterpart in the sāqāsi or a pair of pinchers, still used by the blacksmiths.

III. Tāla Yantra or Picklock-like Instruments.

The third class of blunt instruments is called Tāla-

¹ अपाहृं पे चमायस्य वकिशेन समाहितः ।

मुचुच्छार्गुर्ज मेघावी सचौत्तेष वा पुनः ॥

Suśruta Saṁhitā, vi. xv.

Erichsen's Science and Art of Surgery, Tenth Ed. vol. I p. 342.

ताननुते लग्नाभ्यस्तु वेष्विद्विनापहरेत् ।

to forceps with arms, used by the barbers for depilating the nasal cavities, while the second variety is like the armless forceps used by the goldsmiths. The former consists of two arms joined crosswise by a pin fixed at about their middle points, and so really is a cruciform instrument but is classed here for its different use in surgery. The forceps without handles consists of two blades soldered at one end. Some commentators like to subdivide the pinchers into two classes according as their ends are rough or smooth. And so Hessler translates:¹ "Duae forcipes denticulata et non denticulata".

The sandar̄shas are used for the purpose of extracting foreign substances from the soft structures of the human body, such as the skin, muscles, veins, nerves, and tendons². Generally they have a length of sixteen aṅguli.

Vāgbhaṭa II mentions two other instruments as modifications of the type :—

(a) One variety has the length of six aṅguli. It is intended for the purpose of extracting minute foreign bodies such as thorn, hair &c. and of removing the superfluous eyelashes.³

Cakrapāṇi also advises us to use a sandar̄sha for epilation, which may be called the Epilation forceps.⁴

¹ Hessler's Suśruta. Caput vii. P. 14.

² कोत्तकह चिरुकारीं सन्दर्शीं पोकशाहुलीं ।
लक्षसिराकादुपिशित लग्न चक्रपक्षये ॥ ५ ॥

चतिग्रन्थ चल्लव सन्दर्शेन समुद्दरेत् ।

Aṣṭāṅga Hṛdaya, I. xxv.

Harita Saṃhitā, III. lvi.

³ पहुङ्कोऽन्वीकरणं भूज चल्ली पपच्छादो ॥ ६ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

* See foot-note 2, p. 66.

Similarly in modern times, we remove superfluous eyelashes by the Epilation forceps. Mr. Berry writes¹:—"When the trichiasis is only partial, a temporary improvement is obtained by epilation. In some cases where a few eyelashes only have been left altogether, the patient may procure for himself a pair of forceps, and have the eyelashes removed whenever they cause irritation." Surgical epilation was frequently necessary for trichiasis among the Romans and a similar forceps was in use there.²

In ancient times in India, the barbers used epilation forceps for pulling out grey hairs. In Makha-deva jātaka, we find the following conversations between the king and his barber³ :—

"Barber. There is a grey hair to be seen on your head, O King."

King. Pull it out, then, friend, and put it in my hand.

So he tore it out with golden pinchers, and placed it in the hand of the King."

(b) The second variety is known as the Mucuṇī instrument.⁴ It is a pair of straight forceps, having no curve like that of the sandamāsa. It is serrated finely at the open ends. The soldered end has a ring attached to it as ornamentation. It is recommended to be used for removing painful sloughs and protuberances from a deep-seated abscess. It is also to be used

¹ Practical Ophthalmology, 1904. By G. A. Berry, M.B. P. 52.

² Paulus Aegineta. VI. xiii. (Syd. Soc. Ed.)

³ Rhys David's Buddhistic jātaka stories, Vol. I, pp. 187.

⁴ मुचुटी दृष्ट दलज्जुमूले कचकभूषणा ।

मध्येर हस्तमांसार्थी चार्षणः श्रीघितस्य च ॥ ३ ॥

Aṣṭāṅga Hṛdaya, I. 2

complete the operation for pterygium by removing the remnant, after it has been extirpated by the sharp instruments. Suśruta calls it Mucundi¹, and uses it to hold the pterygium after it has been raised by vajīṣa or hook. It must be then a smaller variety of mucuṭī.

A similar pair of forceps, Dr. Erichsen mentions, and says² that "for the purpose of extracting needles, thorns, splinters of wood and other foreign bodies of small size and pointed shape lying in narrow wounds, forceps with very fine but strong, well-serrated points will be found useful."

Suśruta mentions bāmsabidala³ or bamboo forceps. It is made of a piece of bamboo rod, split longitudinally into two halves nearly to its whole extent. This is like the bamboo tongs used by the smokers in Bengal to raise glowing charcoal to the earthen bowl. It should be used to remove worms from the surface of the human body.

The sandamīśa instrument may be compared with the modern dressing forceps and with the forceps still used by the goldsmiths, known as a sonnā. Those with arms have their counterpart in the sādāśī or a pair of pinchers, still used by the blacksmiths.

III. Tāla Yantra or Picklock-like Instruments.

The third class of blunt instruments is called Tāla-

¹ अपाहृं प्रे चमाचस्य वडिशेन समाहितः ।
मुचुख्यार्था मेधावी गूचीसूचेण वा पुनः ॥

Suśruta Saṁhitā, vi. xv.

Erichsen's Science and Art of Surgery, Tenth Ed. vol. I. p. 342.

ताननुतैलिनाभक्तस्य वशविद्लेनापहरेत् ।

Suśruta Saṁhitā, IV. xxvii.

yantra¹. The word tāla "has been differently interpreted by the commentators. Bhānumati gives the alternative reading (tālu i.e., palate) for tāla, so the instruments likely had their ends shaped like the palatine process of fish. Dallana,² however, maintains that tāla means picklock, the ordinary Indian key which resembles a hook. Two of these are joined at one end, the curved ends being kept free, facing one another. The instrument would then resemble the face of a bhetuli fish. Instruments with one tāla or hook resemble one lip of the fish, and those with two tālas represent its entire face. Both Cakrapāṇi and Dallana however prefer to mean by tāla, the scale of a fish."

They have a length of twelve aṅguli, and are shaped like the jaws of a fish. They may be made either with a single blade (ekatāla) or with double blades (dvitāla) soldered at one end, the hooked ends being free. They are intended for the purpose of extracting foreign bodies from the ear, nose and other outer canals of the body. The ear scoop now used by the barbers of India for extracting wax from the ear is a tālayantra.

१ तालयन्त्रे शादशाहुले मत्स्यतालुबद्देकतालहितालके कर्णनासानाडीश्चानामा-
हरवाये ।

Suśruta Saṃhitā, I. vii.

२ शादशाहुले मत्स्यतालुबद्देक तालके ।

ताल यत्वं षुटे कर्णनाडी शस्यापहारिणी ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

² अथ ताल-शब्देन प्रदेश उच्चते । एतेन एक' तालं प्रदेशी यस्य गदेकतालं वे-
ताले प्रदेशी यस्य तत् दितालकम् ; एतेन मत्स्यस्य गल्कवत्प्रतगुमुखं प्रदेशं एकतालं
मत्स्यशल्कवत् प्रतगुमुखं दिपदेशं दितालहितालम् । परिखाहस्तु कर्णादिप्रवेशी ज्ञेयः ।
अन्ये तु मत्स्यतालकवद्देकतालकहितालके इति पठति । व्याख्यानयन्ति च मत्स्याद्व
भेदुनिमत्स्यः, यस्य लोहमयतालकाकारं सुख्यं भवति अतत्त्वाभ्युक्ताद्वाकारं यन्मेकतालकं,
सर्वमुखाकारं दितालकं, तालकोऽचम्पवारकादिपाटसन्धिवन्मनं लोहमयमुच्यते ।

Dallana's Commentary, I. vii.

For removing substances that have fallen into the meatus auditorius, Paul says:¹ "They must therefore be extracted by an earpick, a hook, or tweezers, or by using powerful shaking of the head, while the ear is placed upon some circular board." Albucasis recommends us to use a slender forceps, which resembles the modern dissecting forceps. He also commands for the purpose a hook slightly bent, which is also mentioned by Celsus.²

IV. The Nāḍī Yantra or Tubular Instruments.

The Nāḍī or tubular instruments are described to be of various kinds and to serve many purposes³. They are open either at one or both ends. These are used for the extraction of foreign substances from the natural outlets of the body. They are also recommended to be used as a diagnostic apparatus for inspection of diseases in the canals. They are the means of sucking out fluid discharges, as pus etc., from cavities and they facilitate the performances of other operations. They vary in length and diameter in proportion to the different sizes of the outer canals of the body, or according to the varieties of purposes to be served by them.

¹ Paulus Aegineta, Vol. II. VI. xxiv. (Syd. Soc. Ed.)

² Celsus, VI.

³ नाडी यन्त्राणेकप्रकाराणेकं प्रयोगनामेकतीमुखान्तुभवतीमुखानि च तानि सीती-गतश्चयीदारणावै रोगदर्शनाद्यमाचूपणावै क्रियासीकाध्यार्थेति तानि सीतवारपरिचाहानि यथायीय परिचाहदीर्घाणि च ।

Suśruta Saṃhitā, I. vii.

नाडीयन्त्राणि यन्त्राणो कानेकं मुखानि तु ।

सीतीगतानां शल्यानामामयानावै दर्शने ।

क्रियाणां सुकरत्वावै कृत्यादाचूपणावै च ।

तविचार परिचाह दैर्घ्यं सीतीजुरोधतः ॥ ८ ॥

The tubular instruments are used for fistula-in-ano, haemorrhoids, tumours, abscesses, injections into the rectum, vagina and urethra, hydrocele, ascites, inhalations, stricture of urethra and rectum and cupping as by gourd and horns.¹

As examples of the tubular instruments, Vāgbhaṭa II. mentions:—

1. KANTHASALYĀVALOKINI² OR THROAT SPECULUM.

To examine foreign substances such as a fish-bone in the throat, the instrument should have a length of ten āṅguli and a circumference of five āṅguli.

Suśruta describes the extraction of a foreign body, made of lac from the throat of a patient by the following device. A heated iron probe or sound should be introduced into the throat of a patient through a tube of copper and made to touch the bit of shellac. The foreign substance would begin to dissolve or soften and so will adhere to the probe. The rod is then to be cooled by sprinkling water through the tube and the foreign body then should be drawn out steadily with it.³ But other kinds of foreign bodies are to be extracted from the throat by means of a rod-like instrument, one end of which is smeared with melted wax or shellac.

The use of some adhesive substance for extraction of foreign bodies accidentally introduced into the outer passages of the

¹ सरन्दराशीर्वद्वयवस्तुचरवस्तिमूत्रहिंदकोदरधूमनिरुपकाशस्त्रिकृशदयनाल्पात्रुप्रदयनाल्पिचोपरिदाइल्यामः।

Suśruta Saṁhitā, I. vii.

² दग्धात्रुलालेनाहान्त कर्षणत्यावलीकिनी।

Aṣṭāṅga Hṛdaya, I. xxv.

³ जटुषे कर्ढासते कर्ढे नाडी परेश्वाग्रितसाव श्वाको तथावस्था श्रीताभिरहि परिविष्ट छिरीभूतमुदरेत्। अजातुषे जटुमधूच्छिट्लिसया श्वाकर्ष्या पूर्वकप्रयोगेके।

Suśruta Saṁhitā, I. xxvii.

human body was well known to the Greeks and Romans. Paul says:¹ "Stones and such like bodies we extract by wrapping wool round an earpick, and smearing it with turpentine-rosin, or some glutinous substance, and introducing it gently into the meatus auditorius."

2. PAÑCAMUKHA AND TRIMUKHA.

To take a good hold of a four-eared arrow, a speculum having five holes (PAÑCAMUKHA) should be had recourse to; and for a two-eared arrow, a speculum having three holes (TRIMUKHA) would be necessary. The central hole is for the arrow, while the side holes are meant for the ears of the arrow.²

Celsus³ says that when a weapon buried in the flesh has barbs too strong to be broken with forceps, they may be shielded with split writing-reeds (Calamus scriptorium), and the weapon thus withdrawn.

Paul says: "Some apply a tube round about the barbs⁴ so that when they draw out the weapon, the flesh may not be torn by the barbs."

In modern times a snare is used instead of a tube. Dr. Erichsen⁵ writes: "The extraction of an arrow is usually attended with little difficulty. But if barbed, special precautions have to be taken. With the view of safely effecting its removal, the snares.....have been devised."

¹ Paulus Aegineta. Vol. II. VI. xxiv. (Syd. Soc. Ed.)

² नाहोपचमुखचिद्रा चतुष्काञ्चस्य मेयहे ।

वारङ्गस्य दिक्षांस्य चिच्छिद्रा तत् प्रभाणतः ।

Aṣṭāṅga Hṛdaya, I. xxv.

³ Celsus. vii. v.

⁴ The Works of Paulus Aegineta. vi. lxxxvii.

⁵ The Science and Art of Surgery. Vol. I. pp. 343.

3. TUBULAR INSTRUMENTS FOR INSPECTION OF ARROWS.

Again for the inspection of the arrows, various kinds of tubular instruments would be necessary, which will vary according to the shape, length, and circumference of the arrows and their ears.¹

4. ŚALYANIRGHĀTANI.

The top of this tubular instrument is shaped like the disc of a lotus and is closed. The other end is open and leads to a hollow extending to a fourth part of the tube. It has a length of twelve aṅguli. It is useful for removing an arrow fixed deeply into the body, in different directions and thus helping its easy extraction.² For this purpose Suśruta directs us to use a stone hammer.

The Śalyanirghātāni had its counterpart in the female part of the Impellent, mentioned by Paul, for forcing an arrowhead forwards through a part so as to extract it at the side opposite to that of its entrance. It would thus be seen that the function of the Impellent was similar to that of the Śalyanirghātāni ; the former moved it forwards, while the latter moved the śalya side to side, the object of both being to extract the foreign substance. The Impellent would seem to have been a plain rod of metal pointed at one end (the male part) and hollowed at the other (the female part) ; the pointed end used to be introduced into the socket of an arrow when it possessed one, and the hollow

¹ वारङ्ग कर्षसंस्थान नाहै देहोनुरीधतः ।

नाडीरेव विचायान्ता द्रष्टुः शल्याचि कारयेत् ॥ १० ॥

Aṣṭāṅga Hṛdaya, I. xxv.

² पद्मकर्णिकया मूर्द्धि^१ महामी वादशाहूत्वा ।

चतुर्थं चुपिरानामी शल्यनिघोतनी मता ॥

Ibid.

end was meant to fit over the tail in case where the arrow was tanged.¹ The Greeks and Romans recognised the necessity of an arrow being moved about until loosened, if it remained fixed in the bone; and Celsus² directs us to strike it with some iron instrument until it be shaken from the place where it is lodged.

5. TUBULAR INSTRUMENTS FOR PILES.

According to Suśruta³ these should be made either of iron, or ivory, or horn or wood. They are hollow instruments tapering at the end which should be shaped like the teat of a cow. For males, the length is four aṅguli, while the circumference is five aṅguli. In the case of females, however, the tube should be made wider, the circumference being six aṅguli, and longer, the length being equal to the space covered by the palm of the hand. There are two slits on the sides—one for inspection of diseases and the other to allow application of caustic and cautery to the diseased part. The slit measures three aṅguli in length and the pulp of the thumb in breadth. At a distance of a half aṅguli from the margin of the slit, is raised a circular projection, also a half aṅguli high.

¹ Paulus Aegineta, VI. lxxxviii.

² Celsus, VII. 5.

³ तथ यन्त्रं लौहं दालं शाहं वाचं वा गोक्षनाकारं चतुराहुलायतं पचाहुलपरिणाहं पुंसा पक्षहुलपरिणाहं नारीयां तत्त्वायतं तददिच्छिद्धं दग्धनायमेकं छिद्रमेकं छिद्रन्तु कर्त्तव्यं। एकदारि हि अक्षत्त्वाराच्योनामतिकमी न भवति। छिद्रप्रमाणन् वरहुलायतमहुऽदर्परिणाहं यदहुलमवशिष्टं तस्याद्वाहुलमध्यक्षाद्वाहुल्यांकितोपरिष्ठाकण्ठिकमिथ्यवाक्तिसमाप्तः।

Vāgbhaṭa¹ describes two different instruments, one for inspection and the other for medication. They both have the same length and circumference. The former has two slits on the side, while the latter has only one slit, three aṅguli long and the pulp of the thumb in width. The annular projection is turned upwards : the object being the prevention of sudden introduction of the instrument too far inwards.

A similar instrument without any slit on the side is called Śami². It is advised to be used for exerting pressure over the piles by its introduction into the rectum (Vāgbhaṭa.)

Rectal speculum is mentioned by Hippocrates in his treatise on fistula³ and by Paul in the treatment of piles.⁴ It is called Calopter in contradistinction to the vaginal speculum which is called Diopter. The rectal speculum in the Naples museum is a two bladed instrument working with a hinge in the middle. In modern times, both the varieties of the speculum, tubular and valved, are in use.

For inspection and medication of piles, a tubular speculum is recommended to be used by the veterinary surgeons. In the

¹ अर्जसो गीकानाकारं यनकं चतुरहुलम् ।
लाहि पवाहुलम् शुसो प्रदानां यक्षुलं ।
हिच्छिदं दग्धे वाचेरेकच्छिद्रन् कन्दपि ।
मध्येऽस्य चाहुलच्छिद्रमहुठोदर विसृतम् ।
अङ्गाहुलोच्छितोइत् कर्णिकव तद्वृतः ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

² अमाल्पा ताहगच्छिदं यनमर्जः प्रपीकने ॥ १३ ॥

Ibid.

³ The Genuine Works of Hippocrates. (Syd. Soc. Ed.) Vol. II. P. 817.

⁴ Paulus Aegineta, VI. lxxix.

Aśvavaidyaka, Jayadatta sūri¹ describes the instrument thus: "The surgeon should know the instrument to have the length of six aṅguli. On the two sides, the wise surgeon should make two slits, three aṅguli long and a half aṅguli broad. Through an instrument with two slits, the piles of the horses should be examined. Through a speculum with one slit, the surgical operations, such as incisions &c., should be performed, after having tied the horse and making him lie down".

6. TUBULAR INSTRUMENTS FOR FISTULA-IN-ANO.

These are similar to the instruments used for the inspection and medication of piles, the only difference being the omission of the circular rings in their construction, for otherwise, the projection may rub over the sore if the speculum be introduced deeply.²

¹ सन्त वहानुसं विदान् चिकिंद्रं पचाहुलं भिषक् ।
अपोऽहोऽहुत्ताविशीर्णे देष्ये शाम्यहुत्तवयम् ॥
उभयोः पार्श्वयोनस्त कुर्याच्चिकिंद्रयं तुष्टः ।
अर्थसेन तु वाहन्य दिच्छिद्देष विलोकयेत् ॥
एकचिकिंद्रेष वे कर्मं कुर्याच्चेदादि पूर्वकम् ।
पातितस्त सुवदस्त तुरडस्त विचवदः ॥

Aśvavaidyaka (Bibliotheca Indica). Liii, vs. 4, 5 and 6.

² किद्रादूर्ध्वं हरेदीष्मण्डयनस्य यन्वित् ।
ततो भग्नदे दधादेतदहेन्दु सज्जिभं ॥

Suśruta Saṃhitā, IV, viii.

सर्ववाप्नयेदीर्द्धं किद्रादूर्ध्वं भग्नदे ।

Aṣṭāṅga Hṛdaya, I. xxv.

7. TUBULAR INSTRUMENTS FOR THE NOSE.

Nasal-Speculum.

Similar tubular instrument without ring is to be used for examination of nasal diseases as tumours and polypus. It is however shorter and thinner than the rectal speculum. Vāgbhaṭa says: "It is two aṅguli long and admits the index finger in its lumen. The tube has a single slit on the side."¹

He describes nasal tubes for introducing medicated powders into the nose as snuff.² After partially filling the tube with powders, one should blow through the empty end, the other end being put well inside the nasal cavity. Suśruta also uses a tube to blow powder into the nose.³ Caraka⁴ mentions nasal insufflation to cure diseases. Śāṅgadharā⁵ and Cakradatta⁶ describe the nasal tube for insufflation to be six aṅguli long and open at both ends.

¹ प्राणार्द्धदार्शसमिक्षिदा नायज्ञुलवया ।

प्रदेशिनी परिचाहा स्याहमन्द्र थलवत् ॥ १५ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

² आन् विरेचन धूर्णो मुख्यात् तं सुख्यायना ।

यहशुलिमुख्या नाया भेषजगम्या ।

Ibid. I. xx.

³ नासाकावे ग्राहतद्युर्मुक्तं नायादेवं योऽपीडवतीक्षः ।

Suśruta Saṃhitā, VI. xxiii.

⁴ मिहि॒ स्थाप्तावने चूर्णस्थां प्रधमने हिते ।

Caraka Saṃhitā, VI. xxvi.

⁵ यहशुला हिवक्ता या नाडी चूर्णनयी धम्नन् ।

तीक्ष्ण कीलभित्तमत् वातः प्रधमने हिते ॥

Śāṅgadharā Saṃgraha, III. viii.

⁶ आपने रेखनधूर्णो मुख्यात् तत् सुख्यायना ।

यहशुल इमुख्या नाया भेषजगम्या ॥

Cakradatta, Nasyādhikāra.

Aretaeus says that a quill or reed or a wide long tube may be used for blowing powders into the pharynx. Alexander Trallianus² says that a calamus scriptorium, the joints of which have been removed, may be used as an insufflator. Oribasius³ however gives the fullest description of the tube used as a nasal insufflator. "A reed slender and with a straight bore, 6 inches in length, and of such a size that it can be passed in the nares, is taken and its cavity entirely filled with medicament. The reed may be either natural or of bronze. This being placed in the nares, we propel the medicament by blowing into the other end."

In modern times, we advise our patients to do the same thing when powders are prescribed to be thrown into the nose or ears. The cylindrical shaft of the ordinary quill so cut as to be open at both ends will serve the purpose admirably. The nasal insufflator is used now for identical object.

Aretaeus⁴ mentions a nasal syringe with a double tube. It consists of two pipes united together by an outlet so that liquid medicine may be injected into both the nasal cavities simultaneously, for injection into each nostril separately, he points out, can not be borne.

It is remarkable that in Mahāvāgga⁵ mention is made of single and double nose-spoons. Nāthu-karani (*i.e.*, an instrument to hold up the nose, so that the medicated oil

¹ Aretaeus, Vol. II., P. 408.

² Alexander Trallianus, IV. viii.

³ Oribasius Collect, xiii.

⁴ Aretaeus, Ed. Adams, Vol. II., P. 459.

⁵ Mahāvāgga, VI. 13, 1 & 2. Sacred Books of the East,

does not run out...Ed.) and Yamaka-nāthu-karaṇī (i.e., one that would go up both nostrils...Ed.). They are recommended to be made of gold, or silver, or bone, or ivory, or horn, or of the *nala* reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of chank-shell". (Sacred Books of the East).

To apply oily medicines inside the nasal cavity a cotton wick is first soaked in the oil and then it is pushed well inside the nose. It is recommended also to pour oil into the cavity through a tube, while the other cavity is pressed by a finger (*Vāgbhaṭa*¹).

To treat a case of fracture of the nasal bones, Suśruta recommends² two straight tubes open at both ends to be introduced into the nasal cavities, after putting the fractured ends in position, either lowering or elevating the raised or depressed end by a rod as required. Then bandages are to be applied. The tubes serve as splints to support the broken ends in position, while through their orifices the patient may breathe without inconvenience.

Similarly Celsus, after replacing the fractured ends in position uses oblong tents sewed round with a thin soft skin as splints into the nostrils; or a large quill smeared with gum, or artifice's glue may be applied in the same way. Paul also

१ नासापुटं पित्तायेकं पर्यायेण निवेचयेत् ।
उच्चाम्भु भेषजये प्रनाद्या पित्तापयत् ॥

Aṣṭāṅga Hṛdaya, I. xx.

२ नासो सदां विहृतां वा अच्छौ कृता गत्वाकथा ।
पृथग् नासिकशीलाद्यी दिमुखी संपवेशयेत् ॥
ततः पैदेन संवेद्य इति सेकं प्रदापयेत् ॥

says: "And some sew the quills of the feathers of a goose into the rags, and thus introduce them into the nose, in order that they may preserve the parts in position without obstructing the respiration; but this is unnecessary as respiration is carried on by the mouth."¹

Suśrata also advises us to introduce these tubes into the nasal cavities during the performance of the Rhinoplastic operations.²

8. THE ĀNGULI-TRĀṄAKA OR FINGER-GUARD.

Vāgbhaṭa says:³ "It is generally made either of ivory or wood. The instrument is shaped like the teat of a cow, and is four āṅguli long. Two slits occur on the sides like those in the speculum for piles."

It protects the finger of the surgeon from being injured by the teeth of the patient and so helps the surgeon in opening the mouth of the patient with ease.⁴

In modern times, finger-guards are used for the same purposes.

¹ Paulus Aegineta, Vol. II. vi, xci. Syl. Soc. Ed.

² सुचंडितं समवयो यदाचत्राहीऽधिनामिसमीचरा वहा :

प्रोत्प्रय चेननवच्चर्ष्येव पतङ्गयटीसभुकाष्ठनैव ॥

Suśruta Saṃhitā, I. xvi.

³ अहुलिचालकं दानं वाचं वा चतुरहुतम् ।

हिञ्छिदं शीसनाकारं तदक्षिणितौमुखं ॥

Aṣṭāṅga Hṛdaya, I. xxv.

⁴ तत्र वक्त विडौ, समृद्धं मुखस्थातुरस्य मुखव्यादान निमित्तं मुखं मुखकरं स्थात् ।
यत इदं दलधातात् रक्षणि अत उक्तं मुखनिति ।

Vāgbhaṭārtha Kaumudi, I. xxv.

चहुं लिंदनेभी रक्षणार्थतोद्धुलिचालनिति नाम ।

Sarvāṅga Sundarī, I. xxv.

9. JONI-VRAṄEKṢĀṄA OR VAGINAL SPECULUM.

Vāgbhaṭa¹ describes it to be a tubular instrument, sixteen aṅguli long, and six aṅguli in circumference. It consists of four blades, attached at their bases to a ring. The tube tapers gradually, the end is free and looks like the bud of a lotus. To the four blades are soldered four rods in such a way that on pressing their free ends, which pass out of the ring, by the surgeon's hands, the tapering end of the tube would gape widely. The surgeon by regulating the pressure of his hand, may open or close the speculum to any desired extent.

Another kind of vaginal speculum used to be manufactured out of the two horns of a buffalo by dividing each into two longitudinal halves. They should be so paired that their concave surfaces would look towards one another, their ends diverging outwards. So we get a pair of bivalve speculum out of a pair of horns.

The bivalve speculum of horn mentioned above, has its modern counterpart in the pair of speculum known as Barne's or Neugebauer's speculum.

१ यीनिवेच्च भज्ये शिरं षोडशाङ्कम् ।
मुद्रावहं चतुर्भित्तमधोज मुकुलामनं ।
चतुःश्लाकमाकारं मूले तदिकसेन्दुष्टे ॥ १० ।

Aṣṭāṅga Hṛdaya, I. xxv.

अथ यत्स्य कर्तवयां चलरिखण्डनि तथा कार्यालय यथा सुद्रिकया वदानि निलितानि
च पद्ममुकुलाकारं मुख्यं, अन्तरं शिरो षड्हङ्कं परिणाइवती नाडी स्थात् । ततस्तन्यचे
प्रत्येकं स्तुष्टुसंन्यप्तं चतुर्स्य श्लाकाः चामुखात् सतिर्वेद्यं श्लाकानामभ्यामि तथा वृद्धीवात्
यथा श्लाकामूलं पौडनेन यत्स्य सुखं विकसेत् ।

Vāgbhaṭārtha Kaumudi, I. xxv.

The vaginal speculum or Diopter is mentioned by Soranus, Paul¹ and other Greek surgeons. Paul describes its method of working as follows:— "The person using the speculum should measure with a probe the depth of the woman's vagina, lest the stalk (fistula) of the speculum being too long, it should happen that the uterus should be pressed upon. If it be ascertained that the stalk is larger than the vagina, folded compresses are to be laid on the alæ pudendi, in order that the speculum may be placed upon them. The stalk is to be introduced, having a screw at the upper part, and the speculum is to be held by the operator, but the screw is to be turned by the assistant, so that the laminae of the stalk being separated, the vagina may be distended." The accounts given by Albucasis² and Haly Abbas³ are similar. These instruments are described to be bivalve, trivalve or quadrivalve. A quadrivalve speculum of the Greeks is identical with the Joni-vranekşana of the Hindus; the only difference being that the former is acted by screw mechanism, while the latter is worked on the principle of the lever. Drawings of several shorts of the Greek instruments are given in the surgery of Albucasis and by Schultet.⁴ There are three specimens of vaginal, speculum in the Naples museum, drawings of which are given by Milne. In modern times, we use similar valvular speculum for identical purposes.

¹ Paulus Aegineta, Vol. II. vi. Ixxiii. Syd. Soc. Ed.

² Albucasis, Chirrug, II. 71.

³ Haly Abbas, Pract. ix. 57.

⁴ Arsenal de chirrug. tab. 18.

10. TUBULAR INSTRUMENTS FOR WOUNDS.

Vrana-vasti or Wound-syringe.

If the wound be caused by deranged air and be very tender, especially if it forms on the lower half of the body, the vasti should be used. In diseases of the urinary organs, such as, obstruction of urine, faulty conditions of urine, impure semen, stone in the bladder and disorders of menstruation, uttara-vasti is necessary.¹

There are two instruments mentioned—one for application of oleaginous medicines to a sore and the other for washing a sinus with medicated lotions. Each consists of a tube and a leather bag. The tube is smooth and rounded and is shaped like a cow's tail.² It is six anguli long. The base is broad and admits a thumb, while the end is narrow and admits a pea. There is a circular projection or ring at a short distance from the end. The base is fitted tightly into a bag of thin leather.³

१ नाडुद्वी ब्रह्मोयम् कचायन्तर्विदेनः ।
प्रधकार्ये विशेषेण तत्र वसित्विधीयते ।
मूवाचाने मूवदोषे गुकदोषेऽग्निरौप्त्वे ।
तथैवात्तवदोषे च वसिरप्युत्तरो हितः ॥

Suśrava Saṁhitā, IV. i.

२ नाडी ब्रह्मानां खेहप्रयोगार्थं प्रचालनार्थस्त्र ह यन्ते आह यन्ते इत्यादि नाडीब्रह्माभ्युचालनाय नाडीब्रह्मानाम्भङ्गार्थं प्रचालनार्थस्त्र यडङ्गलं यडङ्गलं दीर्घं वसियन्नाकृति वसिनेताकारं इति गोपुभाकारि । * * * *

Vāgbhaṭa Kṛṣṇadī, I. xxv.

३ यन्ते नाडी ब्रह्माभ्युचालनाय यडङ्गले ।
वसियन्नाकृती मूलिङ्गलं कलायते ।
अयतः कणिंके मूले निवडसदुचर्म्मयोः ॥ १८ ॥

Aśtāṅga Hṛidaya Saṁhitā, I. xxxv

To prevent the tube slipping out of the bag, an additional precaution is taken by tying a knot of thread over the leather covering the tube. For description of the bag, *vide infra*.

Sārīgadhara¹ however says that the tube should have the thickness of the shaft of a vulture's feather and should admit a moong (Phaseolus Moong). It is eight aṅguli long.

Pālakāpya describes the tube for washing wounds of elephants to be made of copper, and shaped like the karontaka flower. It is sixteen aṅguli long.

In modern times, wound syringes are similarly used to wash the sore with medicated lotions.

For description of the tubes for vrāṇa-dhupana or wound-fumigation, *vide infra*.

11. TUBULAR INSTRUMENTS FOR ASCITES.

Dākodara yantra or Cannula.

It may be either metallic or manufactured from the cylindrical hollow calamus of a peacock's feather.² The tube is open at both ends and is of the same calibre throughout. Suśruta advises us to use a pipe of tin, or lead or a feather to drain the fluid, after the abdomen has been tapped.³

¹ व्रणवस्तु निव स्यात् व्रणामदाइलोग्नितम् ।

सुदृच्छदृष्टप्रवर्णनलिकापरिच्छाहि च ।

Sārīgadhara Saṅgraha, III. vi.

² दिवारा लिका पिच्छलिका वा दाकोदरे । १६ ।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

³ तत्र व्राणादीनाभ्युत्तम्य नाडीदिवारा पञ्चनाडी वा संयोज्या दोषोदक-भवसिंचितसी नाडीमपहल्य तेलस्तवसीनाभ्युज्य व्रणावस्त्रेनोपचरितः ।

Suśruta Saṁhitā, IV. xiv

Celsus describes a lead or copper canula for draining ascites.¹ Paul writes that the tip used to be bevelled off like a writing pen.² It was also employed in empyema.³ Albucasis⁴ mentions a tube of silver or copper or brass having a small hole at the bottom and three on its sides.

In modern times we use a metallic canula of similar shape for draining fluid in ascites.

12. TUBULAR INSTRUMENTS FOR HYDROCELE.

This is practically the same instrument described above. Suśruta⁵ mentions a tube or canula to drain the fluid after tapping the hydrocele with the vrīhimukha śastra or trocar. The Greek surgeons did not describe the operation. They preferred the open incision to puncture.⁶ Rhases, however, describes the operation of puncturing the serotum for hydrocele.⁷

13. TUBULAR INSTRUMENTS FOR URETHRAL STRICTURE.

Suśruta recommends gradual mechanical dilatation of the urethra by means of tubes made of iron, or wood, or lac, well-smeared

¹ Celsus, vil. 15 & ii. 10.

² Paulus Ægineta, Vol. II. VI. L. Syd. Soc. Ed.

³ Hippocrates, ii. 259.

⁴ Albucasis, Chirrug, ii. 54.

⁵ सूतजां स्वेदयित्वात् बलपट्टेन विटयेत् ॥

सिवन्ना: पाच्य तोऽधका हिष्येद्वौहिमुखेन च ।

अथात हिमुखां नाहीं दवा विसारयेद्व मिषक् ॥

Suśruta Saṁhitā, IV. xix.

⁶ Paulus Ægineta, VI. lxii.

⁷ Rhases, Cont. xxiv.

with ghee.¹ He advises us to use the same tube for three consecutive days, then another of larger calibre for three days more, and so on, till the canal be fully dilated. He reserves External Urethrotomy as a last resource.²

14. TUBULAR INSTRUMENTS FOR RECTAL STRICTURE.

Suśruta similarly describes gradual dilatation of stricture of the rectum, using a higher number of dilators after the lapse of three days until the desired effect is attained.³

(a) निरुद्धप्रकाशं नाडीं योहीसुभयतोसुखीं ॥

दारवीं वा जनुकां सूताभजां प्रवेशयेत् ।

परिषेकं वसामचं जिग्मारवराहयोः ॥

चक्रतैलं तथायोज्यं चात्रप्रव्यसंयुते ।

वरहाच्छाहात् स्वलतरां सम्बद्धनाडीं प्रदेशयेत् ॥

योतोविवर्द्धयेदिवं चिरधमद्वचं भोजयेत् ।

भित्तावा सेवनीं सुकां सद्यः चतुर्वदाचरेत् ॥

* Suśruta Saṃhitā, IV, xx.

(b) निरुद्धं प्रकाशं नाडीं दिसुखीम् कनकादिजम् ।

चित्राभजा चुडुकादिचेहेन परिषेकयेत् ।

तेलेन वा वचदाककर्क्कः सिहेन च वरहात् ॥

पुनः स्वलतरा नाडीदेया योतोविवर्द्धये ।

*** *** *** ***

*** *** कुरुद्विष्टप्ते च क्रियाकामः ॥

Unkradnita, Kṣudrarogā Cikītśā.

See also Yogaratnākara, P. 368, where these verses are quoted.

¹ See I (a). अस्त्वाऽः—सेवनी व्यज्ञा शस्त्रैण वा मूच्योतः संकोचकारणं चक्रविदारयेत्। तस्यापि वारस्याविपाटि भृणिः अरमण्ये च दारयेदिति।

Commentary of Śrī Kaṭha in Vyākhyā Kuśumūvalī (Anandāśram Series), P. 406.

² भविष्यत् गुरुं योज्या निरुद्धप्रकाशकिया ॥

Suśruta Saṃhitā, IV, xx.

There is no mention of solid bladder sounds in the Sanskrit medical books. But from the above descriptions, it seems beyond doubt that they had a set of dilators for stricture of the urethra and another set of dilators for stricture of the rectum. These dilators were tubes—either metallic or wooden—and had a regular gradation in the increase of their diameters. Cakrapāṇī mentions stricture dilators of gold.¹

In modern times we have also two sets of these instruments—urethral and rectal dilators, numbered in an ascending series according to the increased diameters of these instruments.

15. TUBULAR INSTRUMENTS FOR INJECTIONS INTO THE RECTUM.

Vasti yantra or Rectal Clyster.

Injections into the rectum are to be thrown by means of a tube with a membranous bag tied to its end. The tube is advised to be made either of gold, or silver, or lead, or copper, or brass, or bell-metal, or ivory, or horns, or glass, or precious stones, or wood or bamboo. It should be clean, smooth, strong, and tapering like a cow's tail, and should terminate in a smooth rounded bulb. The tube varies in length and circumference according to the age of the patient as follows:—

I. Caraka.²

Age.	Length of tube.	Opening at the end admits,
6 years	6 anguli	A moong
12 "	8 "	A pea
20 " and over	12 "	A small plum seed

¹ See foot note I (b), Page 124.

² सुवर्णदध्यप्रतासरोति

कांसायमाम्बिदुभैशुदनैः ।

नलिर्विषाणैर्मणिभित्व तेजैः ।

कार्योणि नेताणि मुक्तिंकानि ॥

II. Suśruta.¹

Age.	Length of tube.	Part of tube in bag.	Circumference of tube.	Circumference at end.	Measure of injection.
1 year	6 anguli	1½ anguli	Little finger	Shaft of heron's feather.	2 anguli
8 ..	8 ..	2 ..	4th ..	Shaft of falcon's feather.	4 ..
16 ..	16 ..	3½ ..	3rd ..	Shaft of peacock's feather.	8 ..
50 ..	12 ..	3 ..	Pulp of thumb	Admits a plum stone.	12 ..
70 ..	Same as that of the 16th year.				

वद्धादगाटाइन् मध्यिति वद्धविश्वितादादशवर्यजानाम् ।
 स्मृमहूककंतु मतीनवाहिच्छिद्राणि वस्त्रायिहितानि चापि ॥
 यथावदयोऽप्युष कनिहकाभां मूलाशयोः क्षुः परिकाहवन्ति ।
 कर्जनि गोपुच्छमसाकृतौनिः श्रुतानि च स्मृतिकामुखानि ॥
 स्थानं कर्णिं केकाण चतुर्थभागे मूलाशये रसि निवस्यने वे ।
 जारङ्गोमाहिष्यहारिणो वा स्वराघौकरो वसिरजस्य चापि ॥
 इदमनुनष्टशिरो विमध्यः कथायरकाः सुश्रद्दः सुश्रुः ।
 त्रिष्णा वयोवैध्य यदानहर्यं निवेद्य शोभान्त सवदासत्त्वः ॥

Cāraka Sañhitā VIII iii

Also quoted in Cakradatta. Anvyañjanābhikara.

^१ तत्र सांबत्सरिकाटहिरट वर्याणां पड़ददशाहुत्र प्रमाणानि कनिहिकानामिका मध्यमा-
हुलि परिषाहानयोजयहुक्तादृ वस्तीयाहुत्र मत्रिविट कणिकानि कहमेन वर्द्धिपय नाहो-
तुल्य प्रवेशानि सुझमावकलायात्र चोतासि विदधात्री वालि तेवु लाक्षायनाद्रय प्रमाणमात्र
हस्तमध्यनेन प्रस्तुतेन मध्यतीती प्रस्तुती हौवत्तामोहुत्र विधेयाः।

भवति चाहुँ।

बर्योभिरिषु नेताणा वक्तिमानसा चैव हि ।

वयोवल्पारीराणि समौक्षा वाँयिदिधि ॥

पञ्चविंशतिकाले दादगाहुलं मूले इच्छोदर परिकाहमये कनिहिकीदर परिकाहमये ताहुल-
मध्यिविट कर्मिकं श्वेतप्रभाडीतुल्यं प्रवेष्य कोलाभिमाचं चिह्नदेव किञ्चकलायमाचं हिन्दमिवेके ।
सर्वजनमूले वल्लिवव्यनाये दिक्षणि करनि । ‘आखापन दत्त्वं प्रमाचं’ तु विहिता दादग प्रस्तुतः ।
मपनीयाहै नेत्रं प्रमाणमितदेवदत्तं प्रमाणान् तिरहव्यवन् ।

तत्र नैवाणि मूर्वणे^१ रजतताम्बोरीति दन्तशङ्खमचितकसारमयाणि शुचाणि हृदाणि गोप्यक्षक्षतीभाजनि शटिका मूर्वाणि । चमथशाहिहानां मृददो नाति वहन्ना हृदा; प्रमाणावलो गोमहिषवरगांजोम्बाणा ।

III. Vāgbhaṭa II.¹

Age. (years).	Length of tube.	Opening at base admits.	Opening at end admits.
Under 1	5 aṅguli	1 finger	A moong (<i>phaseolus moong</i>).
1 to 6	6 "	1½ "	A masha (<i>phascolous Rox.</i>).
7 to 11	8 "	2 "	A kalāya (pea) (<i>pisum sativum</i>).
12 to 15	9 "	2½ "	Boiled pea.
16 to 20	12 "	3 "	A sīgalakoli (<i>sizyphus cenoplia</i>).
over 20	varies according to the age, strength and size of the patient; but the orifice at the base of the tube need not be wider.		

नेत्रलाभि द्वितीयाङ्गौ नलवंशाण्डि सम्भवा ।

बन्धालाभि हिंतं चर्क्यं तुच्छं वा तालवं घनम् ॥

वक्षि निहपदिग्वलु शङ्खं सुपरिमाणिते ।

सदनुहत फौनक सुइःखो इविमहिंसे ।

नेवमूले प्रतिहाय नुज्जन्तु वित्ताननम् ॥

Sūśruta Saṃhitā, IV, xxxv.

१ तयोर्द्वा नेत्रं हेमादि धातु दाढ़ीस्थि वैनुजं ।

गोपुच्छाकारभन्धिद्र शृङ्खलानु गुडिका मुखं ॥

कृनेत्रदे पञ्चपूर्णं चिक्कासातभौऽङ्गुलानि षट् ।

सप्तमे सप्त तालवंही दाढ़ीं योङ्गी नव ।

दाढ़ीवं परं विशाद् वीच्छा वर्षान्तरेषु च ।

वयो वल गरोराणि प्रभावामभिक्षयेत् ॥

साङ्घर्णेन सप्तमूले श्वीलोनाये कनिलधा ॥

पूर्णेऽद्वै इङ्गुल सादाय तद्वार्हे प्रविदिते ।

त्राप्तं लं परमं किंद्रं मूलेऽप्य वहने तु यत् ।

सुइः मायं कलायन्तु मित्रं कक्ष्युकं कमात् ॥

मूलं चिक्किद्रं प्रमाणेन प्रान्ते चटित कर्णिकं ।

वर्णाय पितितं मूले यथास्त्रं वाङ्गुलान्तरं ।

कर्णिका विसर्द्य नेत्रे कुर्वन्तु तत्र च शोऽन्तरं ॥

अज्ञाति महिषादीनां वक्षि मुखदिते दृढं ।

कषाय रक्तं निक्किद्रं यथि गम्भ शिरं तनुं ।

यदित चाप्तमूले मुखं संस्ताय भेषजं ।

वस्त्राभावेऽङ्गपादं वा च्छेष्टासोऽध्यवा घनं ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I, xix.

Cakradatta¹, Śārūgadhara and Bhāva Miśra² follow Caraka as regards measurement. Kharajāḍa³ also gives a similar description.

¹ See foot note 2, Page 125.

१ नेत्रं काय्यं सुवर्णादिधातुभिरचित्वेणम् ।
सर्वेऽन्नैविद्याकाय्यमेणिभिर्वा विधीयते ॥
एकवर्षोऽप्युक्तं यावद्यावद्यानं यद्युलम् ।
ततो द्वादशकं यावद्यानं स्वादद्वृतिमितम् ॥
ततः परं वादशभिरहुलैवदीर्घता ।
सुहिंद्रं कलायामें किंडं कोलास्त्रिमधिभम् ॥
गोपुच्छसत्रिभं सूले अूलं तस्मात् क्रमात् क्रम्य ॥
यद्यासंख्यं भवेदेवं द्वजा गोपुच्छसत्रिभम् ॥
आतुराङ्गुष्ठमानेन मूले अूलं विधीयते ।
कनोहिकापरीकाहमये च गुटिका तुष्टि ॥
तस्मूले कर्णिके रे च काय्ये भागाब्दुष्कात् ।
थोजयेत् तत्र वस्त्रिय वस्त्रियविधानतः ॥
सगात्रयकरणवां सहिष्यस्यापि वा भवेत् ।
भूषकोमस्या वस्त्रिस्त्रा तदलभिर्वा च चर्ष्णेत् ॥
कथायरकः सुनद्रवस्त्रिः चिन्हो हठोहितः ।
व्रथवस्त्रेत्तु नेत्रं स्मात् द्रजामटाङ्गुलोनितम् ॥
सुहिंद्रस्त्रपवनलिकापरिलाहि च ।

Śārūgadhara Samigraha, III, ५.
Bhāva Prakāśa, I, ६.

² वक्षिनेतस्तु शक्तं सहुलुनिकासुखम् ।
भवेद्होपुच्छसंस्थाने सुप्रवाहं विकणिकम् ।
या विभागप्रणयने भवेद्द्वा कर्णिका भवेत् ।
रे कर्णिके चोपरिटारस्त्राधारेऽप्यवालरे ।
साहुलुकपरीकाहं सूलं नेत्रम् शस्त्रे ।
मध्ये त्वनामिकासुखम् तुष्ट्यकलित्रिकं ।
स्वेनाङ्गुलि प्रमाणेन देव्ये स्वाद् वादशाङ्गुलम् ।
कक्षुप्रवक्ष्यहिंद्रं श्रेत्तमन्द्रद्युक्तावयः ।

Hārīta¹ advises us to use a bamboo tube four aṅguli long, which is to be introduced into the rectum up to two aṅguli.

As a general rule, Cāṇaka writes that the broad and the narrow ends of the tube are to be equal to the patient's thumb and little finger respectively, in circumference. The orifice at the end of the tube is to be kept closed by a wick, so that no foreign body may enter the lumen of the tube to occlude it. The plug may be easily removed when the tube is required for use, and then replaced.

Towards the narrow end of the tube is a projection or ring at a distance of about two aṅguli from the extremity. The height of the projection varies with the size of the tube at the base. It acts as a bar to the further introduction of the tube inside the rectum than required. Towards the base are two similar projections, two aṅguli apart from each other. To the one near the base is firmly tied the leather bag, so that the tube may not slip away suddenly during forcible compression of the bag. The other is meant to afford a firm grasp by the surgeon, so that the tube may not move during its introduction into the rectum. These projections are to be made of thread or a piece of cloth and are to be so shaped as to resemble the end of the proboscis of an elephant.

As regards the leather bags, they are recommended to be

विश्वादशषड्वर्षे हादशात्पद्धत्तुलम् ॥

कर्म्भूकं सर्वोदायस्तु विद्वहम् ॥

Kharapāda quoted in Sarvāṅga Sundari, I. xix.

¹ चतुरद्वाला विश्वमयो नाडो प्रतिलक्षणं कृत्वा त्वया वक्षिप्रतिकर्मं कुर्चान् । * * *
मुदाभ्यन्तरे द्वाद्वालमात्रं नाडो सर्वार्थेन भूधीः ।

made of the bladder of cows, or buffaloes, or hogs, or goats, or lambs. The bladder is to be well cleaned first with lime and water, so that no unpleasant smell may be emitted by the decomposition of its muscular tissue, then dyed red with Mañjiṣṭhā (*Rubia Cordifoliatum*) or with Haritakī (*Terminalia Chebula*, Retz.) and thoroughly dried. The bags are recommended to be soft, durable, entire and capacious. If the bladders of these animals are not available, the bags are to be manufactured from a frog's skin, or the peritoneum (one-fourth part would suffice) of any beast, or a piece of leather or a piece of very thick cloth. The size of the bag varies according to the age of the patient. It is to be firmly tied over the first projection at the base of the tube.

In the Siddhīsthāna Chapter XI of the Caraka Saṁhitā,¹ there is a passage showing that veterinary medicine was well-known to the ancient Hindus at a very early period. This portion was edited by Dr̥jihavala and it is impossible to decide whether the passage refers to Agniveśatantra or not. It runs as follows:—“Then the disciples asked: ‘How are clysters to be made in cases of animals such as elephants, camels, cows, horses, lambs and goats?’ To this, the sage Ātreya explained the clysters for

१ अपुच्छदेनं सचवन्निमत्रजीत् विधिच्छत्त्वाह पुनः प्रचीदितः ।
अजाविकेस्तीम् गजोऽयोर्बां गवायोर्बन्निमत्तिमाहिषम् ॥
अजाविकादनासुवलिमसुत्तरं बदनि वसि विपरीतकपम् ।
सुवलिमटादग्नोऽग्नाङ्गुलं तदेवनवच दग्नाङ्गुलं क्रमात् ॥
गजोऽग्नोऽवायजवसि सम्भौ चतुर्थभागे च सुकर्णिकं वदेत् ।
प्रस्त्रस्वत्त्रायोहि निश्चलात्ता गवादित् विविग्नयो यथा वलम् ।
निकह उपास तयादकदयं गतम् ऋद्धिक्षमनुवासनेऽदमः ॥

animals in the following manner. The leather bag of the vasti-yantra should be made of a buffalo's bladder for goats, lambs, elephants, cows, camels and horses. The vasti for these animals is known as suvasti and uttara-vasti as uttara-suvasti. The tube of the suvasti should be eighteen aṅguli long for elephants and camels, sixteen aṅguli for cows and horses, and ten aṅguli for goats and lambs. Like the vasti yantra used for men, it should have a projection at the junction (of the tube with the bladder) and another at the fourth division of the tube from the end."

In the Aśvavaidyaka¹ the tube for the horse is thus described : "The tube should be made either of wood, or metals, or horn, or bamboo, or reeds. Its length should be twelve aṅguli and circumference six aṅguli. The wise surgeon should make the tube of such a calibre as to allow a plum seed to pass through it easily. It should be straight, polished and tapering from the base. At a distance of four aṅguli from the end of the tube, a projection should be raised, while for tying the leather bag firmly to the tube, two projections ought to be constructed at the base".

Pālakāpya² describes the rectal clysters for elephants. He advises that these are to be made either of wood or bamboo. The end is bulbous and the surface smooth. The length

काट्टेदंहरयोभिष्ठ ग्रहवंशनादिभिः ।
इदगाहुलदीर्घन् परिशाहे पड़ालम् ॥
कोलाखिमालचिङ्गन् कुर्यान्ते विचक्षयः ।
सूलादनुकम उजामस्यान् विशेषतः ॥
त्वक्काहुलानि चत्वारि कर्णिकान्तम् कारयेत् ।
पुष्टकस्यापव्याप्त मूर्खे दे चापि कर्णिके ॥

Aśvavaidyaka, XVI, vs. 2—4.

¹ Pālakāpya's Hasti-Āyurveda, See. IV, Ch. V.

length of the tube varies, the most convenient being sixteen aṅguli for men and sixty-eight aṅguli for elephants. The projections at the base of the tube should be twelve aṅguli high. He describes in detail the method of introduction, position of the elephant, etc.

Dṛḍhavala advises us to reject the following eight kinds of tubes and eight kinds of bags¹ :—

I. Tubes—

1. *Hrasva* or too short : For the injection does not reach the proper place.
2. *Dirgha* or too long : For the injection passes beyond the proper place.
3. *Tanu* or too thin : The injection can not pass through the tube easily and so the bag may burst.
4. *Sthūla* or too thick : The tube pulls the mucous membrane of the rectum and anus backwards and forwards during its entrance and exit.
5. *Jirṇa* or old, weak and delicate : The tube may break inside the rectum during its introduction and so cause injury to the gut or anus.

¹ इस्तं दीर्घं तनुस्युलं जीवं शिखित्वन्तम् ।
पात्रं चिह्नं तथा वक्तव्यं नेत्राणि वज्र्यंते ॥
अप्राप्तात्मतिर्थोभक्षयात्मनस्त्वा ।
गुदपीडा वतिर्जिडा लेपां दोषा वयाकम्भ ॥
नासालच्छिद्रविष्वस्तुतजातकवायात्मा ।
किञ्च लिङ्गश तानाटी वक्तीन् कर्मसु वज्र्यंते ॥
तिर्पयम्यविश्वलसायदीशात्मनिस्त्वा ।
केनिलक्ष्यतधायैत्वं वक्ते शाद वक्तिदीपतः ॥

6. Śithilabandhana : The tubes do not fit the bags well, so during compression of the bags, the injected fluid runs out by the side of the tube.
7. Pārśvacchidra or leaky : Having slit on the side, the tube may injure the soft parts by rubbing against them.
8. Bakra or curved : The motion of the injected fluid would be curvilinear. It will strike a side of the rectum and so would not go inside the gut.

II. Bags—

1. Matinsala or fleshy : The bag emits bad smell.
2. Chidra or leaky : The injection escapes outside.
3. Viṣama or uneven : Parts are unequally compressed and so the injection does not issue in a forcible jet.
4. Sthūla or thick : It is difficult to grasp the bag and so it can not be forcibly compressed.
5. Jālaka or having a network : The injection comes out.
6. Vātala or hollow, airy and incompressible : If air can not be expelled out, froth forms in the injection ; and so air is pumped into the rectum.
7. Chinna or torn : The injection flows down.
8. Klinna or moist : The injection can not be forced out.

Suśruta mentions eleven defects of tubes and five defects of bags of the Vasti yantra.¹

¹ अतिष्ठुलं कर्कशमवनतमणिन्नं सप्तिकृद विप्रकृद कण्ठिकं मूर्खातिच्छिदमतिदीर्घ-
मतिइस्मिनेकादग्ने नेत्रदोषाः । यहन्तसाम्यता सच्छिदता प्रसीधता दुर्जिहतेति पञ्चविसि-
दीषाः ।

I. Tubes—

1. Atisthūla : Too thick. } Such tubes injure the rectum and so cause pain.
 2. Karkaśa : Rough. }
 3. Avanata : Curved. }
 4. Anu : Too thin. } It becomes useless to inject
 5. Bhinna : Broken. } fluids into the rectum.
 6. Sannikṛta Karṇika : Projection near? }
 7. Viprakṛṣṭa Karṇika : Projection distant? } Injure the rectum which bleeds.
 8. Sūkṣma : Small orifice. } It becomes difficult to inject
 9. Atihrasva : Too short. } as the fluid comes out.
 10. Atichidra : Large orifice. } Too much fluid passes into the rectum and so pain is
 11. Atidirgha : Too long. } complained of.

II. Bags—

1. Vahalatā : Fleshy. } It is difficult to tie the bags
 2. Prastīrpatā : Large. } over the tubes properly.
 3. Saechidratā : Perforated. } No fluid can be forced
 4. Durviddhatā : Difficult to tie. } into the rectum and so the instrument is useless.
 5. Alpatā : Small. Small quantity of fluid passes into the rectum.

गुदे भवेत् चते रक्तं च माधवं पूर्ववत् शृतं ।

आसन्न लक्षिते नेत्रे निद्रेऽस्मी वायपार्वकः ॥

चवसेको भवेत्वलस्तामादोषान्विवर्जयत् ।

मङ्गल कणि॒के रक्तं गुदमन्तं प्रपोडनात् ॥

अरव्यवापि पितृष्ठा विधिर्वित्तिर्य पितृकलः ।

ज्ञानवेत्वलस्तोतमि च लोको वसिष्ठं पूर्ववत् ॥

प्रत्यागच्छतः कुर्याद्गोमान्वलि विशालजान् ।

दीप्ते महासौतमि च त्रियमन्तवौडवत् ॥

प्रकौशि॑ वहने चापि वस्त्रै दुर्बलं दीप्तवत् ।

वलावल्येऽप्यता चापि डन्यमात्मगुना मताः ॥

दुर्बले चाणु भित्रे च विशेषः भित्र नेत्रवत् ।

16. UTTARA-YASTI.

Urethral, Vaginal and Uterine Tubes.

Injections into the urethra and vagina are also recommended to be thrown in by similar contrivances : the tubes being adopted in length and circumference to the length and breadth of the passages for which they are intended.

1. Tubular Instruments for the Urethra.

The tubes intended for applying medicines into the male urethra is recommended to be twelve aṅguli long. Suśruta¹ advises us to use tubes fourteen aṅguli long. It is to be made of gold and is called Puspanetra. Its circumference is equal to that of a stalk of flower of Jātī (*Jasmimum Grandiflorum*) or Mālatī (*Echites Crayophyllata*, Rox.), and the lumen of the tube allows a mustard seed to pass through it. It is provided with an annular projection just at the central part. Caraka² says that

¹ वसेष्टसंसाधनविधि वच्चाम्यतःपर ॥
अनुद्वाहुलं निवसातुराङ्गुलं सम्भिलम् ।
मालतीपुष्पहलार्य किञ्चिद्दृष्ट्य निर्गमम् ॥
मैद्रायामसमं किञ्चिदिच्छन्ति खलु तदिदः ।
सेह प्रमाणं परमं कुरुथाव प्रकौचितः ॥
पञ्चविंशादधीमातो विदध्याद इतिकिञ्चिताम् ।
निविटकण्ठिकं मध्ये नारीणा चतुरङ्गुले ॥
मूलसीतः परीक्षाः सुह वा हि दशाङ्गुलः ।
तासामपवर्मार्गं तु निदध्याज्ञातुराङ्गुलम् ॥
इङ्गुलं मूलमार्गं तु कन्यामान्तर्वेक्षनाङ्गुलम् ।
विशेषं चाङ्गुलं तामो विधिवहचारं यदा ॥

Suśruta Saṁhitā, IV. xxxvii.

² पुष्पगेतुष्च ईम स्वात् मृत्तमौत्तरविकितम् ।

it has two projections while Vāgbhaṭa¹ describes three. The bag is to be made of goat's bladder. A probe is first passed into the urethra to examine its condition and then the tube is introduced up to the length of six aṅguli. The bladder which contains the injection and which is tied tightly round the tube, is then compressed to force the fluid into the urethra. The tube of course, varies in size according to the dimensions of the organs of generation.

For the female, the puspanetra is described to have the length of ten aṅguli. The projection is at a distance of four aṅguli from the base. The circumference of the tube varies according to the width of the prethral canal. The calibre of the tube allows a moong to pass through it.²

आतीपुष्पस्त्रहनेन समे गोपुच्छस्थितम् ।

रीव्यं वा मर्षपञ्चिदं द्विकांगं वादशाहूलम् ॥ ४८ ॥

Caraka Saṃhitā, VIII, ix.

१ वातुराहूलमालेन तज्ज्वरं वादशाहूले ।
हमे गोपुच्छस्त्रं मूल नभयोः हृत कर्विकं ।
सिद्धार्थकं प्रवेशाये त्रिव्यं हेमादि सम्भवे ।
कुन्दाकमारं सुमनः पुष्पडलोपमे हृद ।
तस्य वलिस्तु दुलघुर्माला भुक्तिर्विकल्पा वा ॥

* * * *

वेत्रं दशाहूले मुडप्रवेशचतुरहूले ।
अपवर्मांगं योज्यं व्याहूलेन सूतवर्णमनि ॥

मूत्रकञ्चिकारे ए वालाना सोकमहूलम् ।

Aṣṭāṅga Hṛdaya Saṃhitā, I, aix.

२ पुष्पनेत्रं प्रमाणनं प्रमदानां दशाहूलम् ।
मूत्रसोतोः परौषार्हं मूत्रसोतोऽनुवाहिं च ॥
मर्मनांगं तु नारीणां लिखेयं चतुरहूलम् ।
व्याहूले मूत्रनांगं तु वालाना सोकमहूलम् ॥

Caraka Saṃhitā, VIII, ix.

Catheters.

It is curious to find no description of so important an instrument as the catheter. Injections were thrown into the urethra but the tube used was always a straight one, having the length of six anguli; so it could not possibly have reached the bladder in the male, and nowhere has the claim been put forward for it to have done so. The tube might have served well for the females. The female catheter of the Greeks, as preserved in the Naples museum, is 0·98 mm. long and is straight throughout (Milne).

In the Atharvaveda Saṁhitā,¹ however, we find a hymn, unmistakably alluding to the use of catheter in ancient times.

Against obstruction of urine with a rod.

"This hymn is intended to be 'used in a rite for regulating the flow of urine'. The reed implies some primitive form of a fistual urinaria, the *vastiyantra* (one of the nādiyantrāni) of the late physicians—who however do not appear to have made frequent uses of it".

* * * * *

6. What in thine entrails, thy (two) groins, what in thy bladder has flowed together—so be thy urine released, out of thee with a splash! all of it. (In the groin are two vessels located in the two sides affording access to the receptacle of urine).

7. I split up thy urinator, like the weir of a tank—so be thy urine released, out of thee, with a splash! all of it.

8. Unfastened (be) thy bladder orifice, like that of a water-

¹ Book 1. 8. Whitney's translations and annotations.

holding sea—so be thy urine released, out of thee, with a splash ! all of it.

9. As the arrow flew forth, let loose from the bow,—so be thy urine released, out of thee with a splash ! all of it”.

2. Tubular Instruments for the Vagina.

Similarly injections were thrown into the vagina. The vaginal tube should be thicker than the urethral tube and in circumference should be equal to that of the little finger. It should be introduced into the vaginal canal up to a distance of four aṅguli, whereas into the urethra, the tube was allowed to enter up to a distance of two aṅguli only in the adults and of one aṅguli only in the girls.¹

3. The Uterine Tubes.

The uttara-vasti comprises the urethral syringe—male and female—and the vaginal and uterine elysters. No distinct uterine tube is described in the text books. But Suśruta² says

१ दाढ़शाहुलकं नेत्रं मध्ये च कृतकर्णिकम् ।
मालतिपुष्पहताभजिहद् मध्यपनिर्गम्म ॥
* * * * *
सौशी कनिदिकाश्च लं नेत्रं कुर्वाहशाहुलम् ।
मुद्ग्रपवेष्य योज्यच योन्यनयतुरज्ञुलम् ॥
दाढ़ुलं सूखमार्गं च सूखं नेत्रं नियोजयेत् ।
सूतकाञ्चिकारिपु वालानामिकमज्ञुलम् ॥

Sārṅghadharī Saṁhitā, III, vii,
Bhāva Prakāśa, I, ii.

² उद्देशावै स्त्रियै दद्युत्सानावै विचक्षणः ।
कल्पतरसम् कल्पावै दद्यात् सुसदु पौङ्किते ।
विकर्णिकेन नेत्रेन दद्यादोनिमुखं प्रति ।
गर्भाशय विश्रुतावै खेडेन विगुणेन सु ।
अप्रत्यागच्छति भिषक् वस्त्रावृत्तमसंक्षिते ।

that to apply uttara-vasti to a female, she is advised to lie supine, keeping her knees flexed and well raised. For a girl the quantity of injection is one prasṛta.

To purify the uterine cavity, apply a clyster of twice the quantity of oleaginous medicines, inside the vagina by means of a tube having three rings. If after the application, the oily medicine does not flow out, then apply a second clyster containing medicines of the group called sōdhana or purifiers, into the rectum; or let the clever surgeon introduce a probe into the space of the clyster; or press under her navel deeply by his closed fist. As the object of the injection is to clean the cavity of the uterus, there can be no doubt that a uterine tube is referred to in the passage. Again the precautions recommended if the injections do not come back easily, point to a uterine tube to have been used, for injections into the vagina can not be delayed in coming out. The Hindu writers often confounded the intra-uterine and urethral injections with the vaginal clyster. Caraka¹ says: "The uttra-vasti is to be used for the females during the period of menstruation, for then the uterus, being in a condition fit for impregnation, has its mouth open and so can easily be reached by the injection." This shows that uterine medication to be the object aimed at by the clyster.

भूयो वल्ति विदधातु संयुक्त शौवनेग्यैः ।

गुदे वल्ति निदधाता शोधनद्रव्यं संसर्ता ।

प्रवेशादा मतिकालस्थिरमयैषशीम् ।

यौकृदात्प्रधोनाभिवैसिनोत्तरसुटिना ।

Susruta Samhitā, IV. xxxvii.

¹ क्षीणादात्मवकाले तु प्रतिकर्णं तदाचरेत् ।

गर्भोस्त्रा सूखे हैं तदादने अपाह्रता ॥

गर्भं योनिस्त्रा श्रीप्रभा त्रिने रजाति माक्षे ॥

Caraka Samhitā, VIII. ix.

The Greeks were no better, for Milne also complains: "It is difficult to separate ancient descriptions of injections into the vagina from those into the uterus, for the terms for the two parts are frequently interchangeable". Again he says: "It is probable that at other times under the heading of 'injections of the bladder', only irrigation of the urethra is meant".¹

18. TUBULAR INSTRUMENTS FOR INHALATIONS AND FUMIGATIONS.

The tubes for smoking were made, like the vasti tubes, of various metals, or glass or wood. Caraka² describes it as a straight tube having three pouches. The end of the tube is equal in diameter to that of a plum seed. Sāringadharī³ adds that a reed or bamboo pipe will also serve the purpose. It is described as a straight tube, the broad base of which admits the patient's thumb while the narrow end, a plum seed. Suśruta⁴ describes the base

¹ Graeco-Roman Surgical Instruments, P. 107-8.

² चतुर्विशितिकं नेत्रं भूमनोभिर्विरेचने ।

दातिंशटहृतं खेहं प्रयोगे चाईसिष्टने ॥

कर्जुविकोषफलितं कौलास्थयप्रभाचितम् ।

वक्षिनेव समद्रव्यं धूमनेत्रं प्रगचने ॥१६

Caraka Saṁhitā, I. 7.

³ धूमनाडी भवेत्तत्र विष्वरुदा च तिपविका ॥१०

कनीहिका परीशाहा राजमाथागमालदा ।

धूमनाडी भवेद्दीपो शमने रोगिणोऽहृते ॥११

चतुर्विशितिसावद् विष्णिवृद्धं दी शूसा ।

तीक्ष्णे चतुर्विशितिः कामवे षोडशोन्दिते ॥१२

दशाहृतिवामनीये तथासाहृतवणादिका ।

कलायमग्नेत्र धूमा कुलत्वागमरन्त्रका ॥१३

Sāringadharī Saṁhitā, III. ix.

⁴ तत्र वक्षिनेत्रद्वयैर्धूमनेत्रदव्याचि व्यासातानि भवनि । धूमनेत्रम् कनीहिका परिशाहमये कलायमात्रं सोतोऽहृतं हृष्टपरिशाहं धूमवलं प्रदेशं सोतोऽहृताकष्टं चत्वारिंशा प्रायोगिकं । दातिंशट् खेहने । चतुर्विशितिरेचने । षोडशाहृतं कामवे वामनीये च ।

and end of the tube to be equal in circumference to that of the thumb and little finger respectively. The orifice should allow a common pea to pass easily through the tube. Vāgbhaṭa¹ says that there are three pouches or dilatations of the tube, shaped like the half-open buds at equal distances from each other. The tube is supposed to consist of four equal parts. The first pouch is located at the end of the first part, the second and third pouches at the ends of the second and third parts respectively. Cakradatta² also describes it similarly.

Dṛḍhabala³ mentions another method of inhalation. He makes a paste of the medicines prescribed and smears it on a piece of silk cloth. This is then to be rolled round like a wick. This wick is to be dipped in ghee before use, and fire lit at one end, while the patient is to smoke it through the other end.

एते अपि कोलाम्बितात् चिह्ने भवतः । वस्त्रनेत्रमटाहूले वस्त्रधृपनाथं कलायपरिमहान्
कुलस्त्राहि सोत इति ।

Suśruta Saṃhitā, IV. xl.

१ वस्त्र नेत्र मम द्वयं विकोथं जारयेहन् ।
मूला शेषाहूल कोलाम्बि प्रवैश्च धूमनेत्रकं ।
तौष्णि खेहन मध्येषु तौष्णि चत्वारि पद्म च ।
चक्रमौनोऽकमात् पातुः प्रसारेण नाटकानि तत् ॥६॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxi.

२ जहजुचिकोषकलित् कोलाम्बिदप्रभाषितम् ।
वस्त्रनेत्रमटव्यं धूमनेत्रं प्रशसाने ।
माहित्याशयतः पूर्णोऽप्सा द्यायोगिकादिषु ।
नेत्रं कासहरे लंगाहीनं शेषे दशाहूलः ॥

Cakradatta, Dhūmapāṇihīlīkāra.

३ प्रपुन्दरीकं मधुकं जाहूं द्वाः समनविलाम् ।
सरिवं पिपलीं द्वाचामिलो मुरसमझरीम् ॥
कुला चन्द्रे पिवत्तम् चौभवेलानुबन्धिताम् ।
इताकामनु च चौरं गुडीदकमदापिता ॥

Caraka Saṃhitā, VI. xxii.

Both Caraka¹ and Śārṅgadharā² advise us to make tubes of medicines, the fumes of which are advised to be smoked in the following manner:—Powder the medicaments and make a paste; measure one karsa; take a smooth reed (*Saccharum sara*, Rox.) twelve aṅguli long. Apply the paste round the reed, for a length of eight aṅguli. Dry it in shade. Remove the reed, leaving a dried tube of the paste. When required for smoking, light one end of the tube with a burning wick and smoke through the other end.

Caraka³ describes another inhaler, which consists of two earthen basins (*soraba*) placed upon each other, their edges being pasted with flour. The upper one is perforated at the centre for the reception of one end of the tube, the patient puts the other

१ पितृ लिप्येच्छरेष्ठोकां ता वसि वशमद्भिरः ।
अहृतमस्त्रिता कुर्यादटाहृतमसा निष्क् ॥
शुक्रो निरभां ता वसि धूमनेत्रापितरा नषः ।
संहाकमपिसंपृष्टा पिवेत् प्राणोगिको मुखाम् ॥ ६ ॥

Caraka Saṅhitā, I. v.

२ अदेविकां प्रतिपेश मुद्गला वादगाहुलाम् ।
धूमदृश्यस्त कल्पे न लिपयाहाहृते ख्यातः ॥
कल्पक' कर्यन्ति लिपा काया शुक्रव जारयेत् ।
इपिकामपर्नीयाय च हातां वर्तिमादशात् ॥
अहृतर्दीपितो ज्ञात्वा धूता नेत्रस्त रम्युके ।
वदनेन पिवेत्तुम् वदनेनैव संत्यजेत् ॥
नाभिकाम्या ततः पीता मुखीनैव वर्तत् सधौः ।

Śārṅgadharā Saṅgraha, III. ix.

३ सधुच्छिद्धं सञ्चरसं पूर्णं सञ्चकमपुटे ।
कृत्वा धूमे पिवेच्छुहृष्ट वाले वा चातु वा गवान् ॥
ग्योलाकवृहृमानानो नार्हृ गुण्डृ कुरुमा वा ।

Caraka Saṅhitā, VI. xxi.

end into his mouth for inhalation. The lower pot contains glowing charcoal of catechu (*Acacia catechu*, Linn.) wood, over which are put pills of necessary medicines. The tube is from eight to ten anguli long.¹ This inhaler is intended for phthisical subjects. It is useful for allaying cough and exciting emesis. This instrument is called *mallaka sampūta* or *sorābū sampūta* or a pair of earthen basins. In such an apparatus Caraka recommends us to put powders of cow's horn, hairs, nerves and ligaments, besides other medicines. Susruta², Vāgbhaṭa³ and Cakradatta⁴ also describe it. Śārṅgadhara⁵ however reserves this instrument for fumigating wounds only.

The length of the pipe will vary according to the different kinds of smoking prescribed by the physician. There are five kinds of smoking narrated :—

1. Śamana, madhya, proyogika — medium.
2. Brīnhana, snehāṇa, mṛdu — mild.

¹ दशाहूलोचितां नाडी अथवादाहूलोचिताम् ।
ग्रावसंपुटच्छिदं कृत्वा जिक्षा विचरेत् ॥
पैरेचनं सुखिनेव कासवान् धूमसापिवेत् ।

Caraka Saṃhitā, VI. xxii.

² इतरयोन्येत धूमोऽपार लिङे समाहिते शरवे प्रचिप्य वज्ञि मूलचिक्कदेशान्वेत शरवेण
प्रधाय तथिन्निछिदे नेत्रसुलं संदोज्य धूमसापिवेत ।

Susruta Saṃhitā, IV. xl.

³ शरव संपुटच्छिदे नाडी नवस दशाहूलो ।
चटाहूलो वा वक्षेष कासवान् धूमसापिवेत् ॥

Astāṅga Hṛdaya Saṃhitā I. xxi.

⁴ अथवा सघृतान् शक्तून् कृत्वा नहिकासन्धुटे ।
नवप्रतिश्वायवतां धूमं देयः प्रयोजयेत् ॥

Cakradatta, Nūsāroga Cikitsā,

¹ See foot-note 2, P. 145.

3. Recana, śodhana, tīkṣṇa — strong.
 4. Kāsaghna — anti-cough.
 5. Vāmana — emetic.

So the length of the tube would vary thus—

1. Caraka¹

			Āṅguli.
In strong smoking	...	...	24
„ medium „	...	...	32
„ mild „	...	...	96

2. Suśruta.²

In medium smoking	...	...	48
„ oleaginous „	...	...	32
„ brain-sedative „	...	...	24
„ anti-cough or emetic „	...	...	16

3. Vāgbhaṭa.³

In strong smoking	...	...	24
„ medium „	...	...	32
„ mild „	...	...	40

4. Śārangadhara.⁴

In medium smoking	...	...	40
„ mild „	...	...	32
„ strong „	...	...	24
„ anti-cough „	...	...	16
„ emetic or wound-fumigation	...	...	10

FUMIGATION.

Similarly wounds are said to be purified by suitable medicinal fumigation. In the purification of wounds by fumigation, we get a glimpse of the antiseptic method of treatment in its

¹ See foot-note 2, P. 140.

² See foot-note 4, P. 140.

³ See foot-note 1, P. 141.

⁴ See foot-note 3, P. 140.

embryonic form. Suśruta¹ recommends the tube to be eight anguli long and to have the circumference of a common pen; and its orifice should be of the size of a kulattha (*Dolichos biflorus*, Linn.). The fumes of medicated substances from the inside of any closed pot containing fire, pass out through the tube and are allowed to play on any sore to purify it. For this purpose two earthen pots—sorāha sampaṭa—may conveniently be used as before. Śāringadharā² uses a tube ten anguli long and recommends us to use Nimba leaves (*Azadirachta Indica*) for wound-fumigation. As another instance of the application of the principles of antiseptic methods to practical therapeutics, we may mention the use of medicinal injections into the cavity of the uterus to rectify its morbid conditions.³

A similar instrument was used to fumigate the uterus and vagina in various diseases of these parts. "Fumigation", says Suśruta,⁴ "is to be applied to the vagina by burning the

¹ त्र्यमेतस्माद्बुद्धं वृशवपुष्पार्थमकलायपरिमध्यले कुलत्वाहिसोत्तिः ।

Suśruta Saṃhitā, IV. xl.

म चौमध्यवसर्पिभिर्धुपनाहैषधुपयेत् ।

Ibid. IV. i.

² दग्धुलिवाननीये तथासाद् वृशनाडिका ।

कलाय मण्डलस्थला कुलत्वाग्मरन्तुका ॥१३

* * *

शरावसम्पुटे चिंडा कलकमङ्गारदीपितम् ॥१०

किंदे नेव' निवेश्याय वृशनेनैव धूपयेत् ।

* * *

तथे निष्पवचायच्च धूपने स प्रशस्ते ।

Śāringadharā Saṃgraha, III. ix.

³ See foot note 2, P. 1318.

⁴ सर्वसङ्गे तु शोषिण धूपयेत् त्र्यामपर्विष्ठोकिण पिण्डीतकेनवा ।

Suśruta Saṃhitā, III. x.

slough of a snake (Bungarus) or pinditaka (?) wood, in cases of obstructed delivery of the fetus. Caraka¹ mentions fumigation of the vagina by burning Bhurjapatra (Betula Bhojpatra), glass, precious stones and the slough of a snake as one of the means for removing the placenta. To remove the after pains and difficulty in micturition and defecation, Suśruta² advises us to fumigate the vagina. He recommends fumigation of the uterus with purifying medicines. In fumigating these parts, the Hindu surgeons desired a local action, and did not share in the belief, held by some of the Greek gynaecologists³ that "the uterus was an animal within the body which could wander about, being attracted by pleasant smells and repelled by disagreeable smells".⁴ The Arabs also did not believe uterus to be an animal.⁵ This method of treatment was well known to the Greeks; for Hippocrates⁶ writes that "fumigation with aromatics promotes menstruation and would be useful in many other cases, if it did not occasion heaviness of the head". He "directs us to take a vessel which holds about four gallons and fit a lid to it so that no vapour can escape from it. Pierce a hole in the lid, and into this aperture force a reed about a cubit in length so that the vapour cannot escape along the outside of

¹ भूत्यपवकाशमिति सर्पनिश्चोकेयाम्बा योग्यि धृपयेत् ।

Caraka Saṃhitā, IV. viii.

² कटुकालात्रुक्तत्वेष्वन् सर्पय सर्पनिश्चोकेच्चा कटुत्वं विमिश्येद्यनिसुखं धृपयेत् ।

* Suśruta Saṃhitā, III. x.

³ Aretaeus. Morb. Acut. ii. 11.
Plato's Timaeus.

⁴ Greco-Roman Surgical Instruments. P. 158.
Adam's Commentary on Paulus Aegineta, Vol. I, Bk. II, P. 636-37.

⁵ See also in the Hippocratic treatises, as Nat. Mal. vii, 9; I Morb. Mal. xvii, I; II Morb. Mal. xl, 20, 21; Steril. vi, 3; Superfet. ix, 3, x, 9, II.

the reed. The cover is then fixed on the vessel with clay.¹¹ Oribasius² and Soranus³ used similar instruments for the purpose.

DISINFECTION OF ROOMS, CLOTHES, etc.

Caraka⁴ says that if peacock's feather, bones of vaka bird, white mustard and red sandal wood, well powdered and mixed with ghee, be used in fumigation, the poison of a room, beddings, seats and clothes, is got rid of. Śārṅgadhara⁵ advises us to disinfect a sick room by the fumes caused by burning the following substances with ghee : peacock's feather, Nim leaves (*Melia Azadirachta*), Vribati, pepper, asafetida, Jotāmānsi (*Nardostachys jatamansi*), seeds of Sālmali (*Bombax malabaricum*), goat's hair, slough of a serpent, cat's faeces and ivory. Suśruta⁶ advises fumigation of a sick room for a surgical patient for

¹ Greco-Roman Surgical Instruments P. 159.

² Coll. xxix.

³ Soranus, xxiii.

⁴ शिखवृक्षवल्लकाकांडीनि सर्पयायनदेन च घटदुःखः ।

धूमो दृढग्रयनासनवस्त्रादिषु शस्त्रेन विष्टुत् ॥५८॥

Caraka Saṃhitā, VI. xxv.

⁵ मयूरपिण्डे निवस्तु पवाणि उडतीकलन् ।

मरिचे हिङ्गु मासी च बीजं कापोमसमग्रवम् ॥

इगरोमाहिनिर्भक्तिं विष्ठा वैदलिकी तथा ।

मजदलय तच्छूणे किञ्चिहृत विनिश्चितम् ।

मैत्रेषु धूपनं दत्तं सर्वव्यालयहास्यत् ।

पिण्डाचान् रात्तासञ्जिता सर्वज्वरहरी भवेत् ॥

Śārṅgadhara Saṃgraha, III. ix.

⁶ सर्पयारिष्टपवायो सर्पया लवचेन च ।

दिरश्च कारयेहूपं दशरात्रमतन्दितः ॥

Suśruta Saṃhitā, I. xix.

ten days, morning and evening, after the operation has been performed.

15. TUBULAR INSTRUMENT FOR CUPPING.

Generally cow's horn is recommended for the purpose. It is eighteen aṅguli long, its base, forming the mouth of the instrument, is three aṅguli wide (*Vāgbhaṭa*).¹ It is conical in shape and the cone is said to be either curved or straight. The other end is pointed and perforated to the extent of allowing a mustard seed to pass through it. The narrow end, however, is made to assume the shape of a woman's nipple by winding thread round it. This facilitates the operation of suction by the mouth of a surgeon when the broad end is placed against any diseased area of the patient's body. *Suśruta*² mentions its use in blood-extraction. For extracting blood, the part must be scarified before its application; and to facilitate the operation, the part should be fomented (*Yogaratnākara*).³ After suction, the horn is to be covered by a piece of cloth or a small bladder of animals.

*Vālīki*⁴ describes the śṛṅga thus:—"It is the horn of a white cow, half-moon shaped and seven aṅguli broad. The orifice

¹ वाहूलासां भवेच्छृङ्गं चूपसेऽदादशाहृतं ।

अरेसिद्धार्थकच्छिदं सुनभुतुकाहृति ॥

Aṣṭāṅga Hṛdaya Samhitā, I. xxv.

² तवप्रचिह्नते ततुवस्त्रपठलावनहेन शङ्खेन शोणितमवसेच्चवदाच्चयत् ।

Suśruta Samhitā, I. xiii.

³ स्त्रेदं विदध्याल्कुशलय नादा शङ्खेन रक्तं वहुदः हरेषः ।

Yogaratnākara Arbuda cikitsā,

* विषाणः चेत्पोरिन्दूषकं समाहूलायतम् ।

चित्तानः पितृपैशिकं वीज्ञ वातयुतेऽसजि ।

शङ्खं देष्मुखवन्धुले किदमयेष्टा सुद्रवत् ।

Vālīki quoted in *Nibandha Samgraha*, I. xiii.

at the base is equal in circumference to that of the base of the thumb, while the end which is perforated admits a moong. This orifice at the end is closed by a wick of cotton". Cakrapāṇidatta says that the horn should be three aṅguli long, and its orifice should be of the size of the stalk of an oleander flower.

Suśruta mentions a peculiar use of the horn¹: the extraction of an insect, cerumen, etc. from the middle ear by means of a horn or a probe. The horn was evidently used as an apparatus for suction, and Suśruta describes suction as one of the methods of extracting śalya from the body². Caraka³ uses horns and leeches to extract venom from a snake-bite; and Suśruta also refers to it. Besides the horns and cupping glasses, suction used to be accomplished by the surgeon's mouth.

Similarly Paul⁴ says that foreign bodies may be sucked out from the ears with a reed.

On the method of suction as a mode of treatment, Erichsen⁵ says:— "In former days, when duels with the small swords were of frequent occurrence, persons called "suckers" who were often the drummers of a regiment, were employed to attend the wounded combatants. This treatment which was conducted with a certain degree of mystery, consisted in sucking the wound till all blood ceased to flow, and then applying a pellet of chewed

¹ कर्णविद्रु वस्तुमानं कौडं लोदमलादि वा।

यज्ञेषापहरहीमाशकायि गन्ताकथा।

Suśruta Saṃhitā, VI. xxi.

² See foot-note 3, P. 108.

³ देशं वा चुपेन्द्रुतिन् यवचूर्णं पांशुपूर्णं।

प्रचलन् देखनलौकः भ्रातृः सायं ततो रक्तम्॥

Caraka Saṃhitā, VI. xxv.

⁴ Paul, VI. xxiv. and III. xxiii.

⁵ Erichsen's Surgery, Vol. I. p. 341.

paper or a piece of wet linen to the orifice; in this way it would appear that many sword thrusts traversing the limbs were healed in a few days. The process of suction cleared the wound thoroughly of all blood, and drawing the sides into close apposition, placed the parts in the most favourable condition possible for union by primary adhesion. This practice might, perhaps, in many cases advantageously imitated in the present day by means of a cupping glass and syringe".

We also find Suśruta¹ describing a vasti yantra in the treatment of snake-bite. The tube is open at both ends, one end is applied to the part bitten by the snake, while to the other end the surgeon puts his mouth to suck out the poison. So this vasti yantra may be compared to the modern aspiration syringe.

Cupping instruments of metal or horn are still used by the Arabs in Kordofan and Sir R. Pasha² suggests that cupping is possibly borrowed by the west from the "most perfect physicians" the Arab. But now we are confident that the credit is due to the Hindus.

ALĀBU YANTRA.

Alābu or gourd is described to be made of the bark of the succulent fruit called alābu (*Lagenaria Vulgaris*). The pulp is scraped away and the bark is allowed to dry. Such a bark should be selected which is twelve and eighteen aṅguli in length and circumference respectively. Its mouth should be circular and should have a diameter of three or four aṅguli. A fire is to be lit inside it by burning a strip of dry cloth to produce a vacuum, and the

¹ प्रतिपूर्वं सुखं वज्रेहितमाचृष्टं भवेत्।

Suśruta Saṃhitā, V. v.

² Vide Third Report, Wellcome Research Laboratory at Gordon. P. 316.

instrument to be applied instantly to the intended part of the patient's body. It should be thus used to drain blood and phlegm from the body (Vāgbhaṭa¹). In modern times cupping glasses are used for like purposes in a similar manner.

Vällüki² describes the alābu yantra thus:—“The mouth of the instrument is well formed and has the diameter of four aṅguli. The body has the circumference of eight aṅguli and is well smeared with a paste of black mud. It is used for drawing out blood”. In yogaratnākara³, śrūga and alābu are directed to be used for extraction of blood from accidental wounds. Caraka mentions the use of alābu for blood-extraction⁴.

Another instrument known as the ghaṭī yantra was used exactly in the same way⁵. It is said to consist of a brass pot

¹ साहादशाङ्गुलोऽलाबुर्णहि लटा दशाङ्गुलः ।

चतुरङ्गुलं तत्सामो दौनोऽनः शे परकाष्ठत् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

² अटाङ्गुलपरीक्षाहा चतुरङ्गुलनालस्थिता मुमुखो क्षेत्रदातिता तनुः रेता रक्तावस्थेनेऽलाबुर्णिति ।

Vällüki quoted in Nibandha Saṅgraha I. xiii.

सानन्दीपियाऽलाब्वा ।

Saṃkuta Saṃhitā, I. xiii.

³ हिंद्रे भिंद्रे तथा विंदे चते मध्ये भिंदनवरः ।
पद्मवेण संस्किदे त्र्यं त्र्यविशारदः ॥
सुहम्मेहयंथा दुःखे ना प्राप्नोति त्र्यो नरः ।
अद्यवा दीप्यनवधोटज्जा स्वेदयस्तुः ॥
सन्तदया तत्त्वोऽपावस्थोगतः क्रमात् ।
दृष्टं रक्तं क्षितं चापि शङ्खलाभ्वादभिर्हेत् ॥

Quoted in Yogaratnākara.

⁴ रघिरागमार्घमयवा शङ्खलाभुभिराहरेत् रक्तम्—

Caraka Saṃhitā, VI. vii.

⁵ तददपटीहिवा गुच्छ विलयोद्धने च सा ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

which is still used commonly in India by all classes of people for drinking purposes. A fire should be lit inside as before and the ghaṭī applied to the surface of the body covered by a piece of cloth. It soon becomes firmly fixed and is thus used to raise abdominal tumours by means of it for purposes of correct diagnosis and also to effect its cure by subsidence. It is still used by the common people for the same ends.

Caraka¹ says:—"After the abdominal tumour has been relaxed or softened a little by fomentation and oleaginous application, it is to be covered by a piece of cloth. Then inside a small ghaṭī, a fire is to be lit by burning kuṣa and other forms of grasses; the pot is then to be inverted and pressed over the part covered by the cloth. By this way, the tumour would be drawn upwards &c. be made prominent. The ghaṭī is then to be taken away and after removing the cloth, and examining the extent of the tumour, it is to be incised. The different shapes of the incisions are called vimārga, ajapala and ādarśa. After incision, the tumour is to be pressed and rubbed with fingers. But the intestines and the heart must not be touched."

The extraction of blood by means of cups, has been practised from remote antiquity. It is interesting to note that both the Latin and Greek terms—*cucurbitula* and *oxeva* signify a gourd;

¹ शिखस्विन्द्रगरीराय गुच्छं शैविल्यमासते ॥
परिवेष्य पदोपात्मा वन्त्रजानयवा कुशान् ।
भिपक्कुष्टे समावाष्य गुच्छं चट्टमुखं चिपेत् ॥
स रहीतो यदा गुच्छादा घटमधोहरेत् ।
वस्तानर्ततः कला भिन्नादिगुच्छमाणवित् ॥

and we know that Alābu also means a gourd. It is curious that the instrument should have been known to the ancient Hindus and Greeks by the same name.

Prosper Alpinus¹ (16th century) who wrote a book on the state of medicine in Egypt in his time, gives drawings of cupping horns he saw there. The horns were those of young bulls, highly polished, with a small hole at the top, by which the air was extracted by suction. To close the orifice a small tab of parchment was taken into the mouth and affixed by the tongue. The Egyptians also used cupping glasses, by suction and not by fire, a method evidently unknown to them.

Hero of Alexandria (B. C. 285—222) describes an interesting form of cup. Milne summarises his account thus:²—"The figure shows a cup of ordinary flattened form, divided into two by a diaphragm. Two tubes pass through the fundus, one passing through the diaphragm, the other not. Each of the tube is fitted with another which is open at its inner end but closed at its outer end and provided with a small cross bar to rotate it. Each of these sets of tubes is perforated by small openings. In the case of the short tubes, these are outside the cup, in the case of the long tube they are inside the cup, in the chamber shut off by the diaphragm. By rotating the piston these openings can be placed in apposition or not at will, thus forming valves. Open valve A by placing the hole in apposition. Close valve B by turning the holes away from each other. The inner chamber of the cup is now shut off except for the small hole A. Apply the mouth to the valve A, and suck the air out of the chamber. Close valve A. Apply the cup to the affected part. The advantage

¹ *De Med. Aegyptiorum.* Ed. 1541 lib. ii. ch. xii. p. 139.

² *Graeco-Roman Surgical Instruments.* P. 104.

of this arrangement is that the affected part is not directly sucked upon by the mouth ; and the instrument is therefore more pleasant for the operator to use".

Celsus¹ thus describes the different kinds of cups :—"There are two kinds of cups, bronze and horn. The bronze is open at one end and closed at the other ; the horn, open at one end, as in the previous case, has at the other end, a small foramen. Into the bronze kind, burning lint is placed, and then the mouth is fitted on and pressed until it sticks. The horn is placed empty on the body, and then by that part where the small foramen is, the air is exhausted by the mouth, and the cavity is closed off above with wax and it adheres in the same way as before. Either may advantageously be constructed, not only of these varieties of materials but of another substance. If other things are not to be had, a small cup or a narrow mouthed jar will answer the purpose. When it has fastened on, if the skin has previously been cut with a scalpel, it extracts blood ; but if it be entire, air".

Paul² remarks that "those which are made with longer necks and broader bellies are possessed of a strong power of attraction." Both Oribasius³ and Aretaeus⁴ allude to them. Antyllus says that there are three materials of which cups are made—glass, horns, and bronze. A good number of such cups occur in the Naples, British and Scottish National Museums.

¹ Celsus II. xi.

² Paulus Aegineta. VI. xii.

³ Med. Coll. VII. xvi.

⁴ De Morb. Acut. I. 10.

Albusasis¹ gives a full account of dry cupping. In applying the instrument he advises us either to create a flame in it, or to fill it with hot water. He gives drawings of various instruments of cupping. Rhases speaks of applying a glass or a cupping instrument to draw off blood after leeching. The other Arabians give little additional information.

In modern times, cupping glasses are used in the same way as before.

V. Śalākā or Rods.

The rods, or pricker-like instruments, or probes are described to be of various kinds and are recommended to be used for various purposes²; so their length and circumference would vary according to some special uses required of them. Suśruta³ says : "There are two kinds of śalākā with their ends shaped like the head of the earthworm. They are used for probing abscesses and sinuses.

Two śalākā have their ends shaped like the wing of an arrow. These are to be used for raising any part for the purpose,

¹ Albusasis, Chirurg. ii. 48.

² नाडोत्तरात् शलाकामोनुकारं तृतमहिनः जने ।

करीरवालाङ्गुलिभिरेवता इपयेतिष्क ।

Suśruta Saṃhitā, IV, 1.

³ शलाकाप्रवाणायुपि नाना प्रकाराणि नाना प्रयोजनानि सथायोग्यपरिणाहदीर्घाणि च तेषां मधुपदशरपुडसंपेक्षा बड़ीमधुष्ठे हैं हैं एवम् व्युहनचालनाहरसाध्यसुपदिश्वते । गम्भृदल-मात्रमुखे वै किञ्चिदानन्दे कोत्तरतत्त्वात्त्वीद्वरणाथे । षट्कापोमकृतोचोषणि प्रभास्त्रेन किञ्चामु । चौणि दल्जाङ्गतीनि खलमुखानि चारोपथप्रणिधानाथे । तीस्त्रम्भानि ज्ञात्वदनानि बीम्बादशवदनानि प्रक्रान्तिकर्त्त्वमिप्पे तानि । नामावृद्धरणाद्यमेकं कोत्तरास्त्रिदलमात्मुखं खलातीज्ञोत्ते । अहमाद्यमेकं कलापरिसंकलनमुखयो द्वुक्तात्वे । मृतमामेकिशीप्रयाप्त-मेकं सात्तरीपुष्टव्याप्रमाणपरिमत्यात्मिति ।

Suśruta Saṃhitā, I, vñ.

after incision, of extracting any foreign body from it. Others assign to them the function of bringing together the lips of the wound caused by an abscess being opened and emptied.

Two *śalākā* have their ends shaped like the hood of a snake. They are useful for transferring any material from one part to another. Some of the simple probes used by the ancient Greek and Roman surgeons carried a single or double snake of *Æsculapius* at one end. But evidently it was meant as an ornamentation and served no useful purpose.

Two *śalākā* have their ends shaped like a fish-hook but are blunt. They are used for extracting any extraneous material from the muscles or bones".

The last six kinds of *Suśruta* are practically the same as the six *śāṅku* of *Vāgbhaṭa*,¹ which are the following :—

The *śāṅku* are six in number. Amongst these, two are twelve and sixteen *aṅguli* long respectively. They are used for the purpose of raising a foreign body upwards from the wound.

Two varieties have their ends shaped like the hood of a snake. They are ten and twelve *aṅguli* long ; and they are used for the purpose of moving a foreign body in the wound in all directions.

Two varieties have the shape of a fish-hook—the ends resembling the stem of an arrow. These are used for the extraction of foreign bodies from the wound.

¹ शङ्कवः पदुभी निषा पोऽशादग्राह्यलौ ।
व्यहने फिरकावज्जी ही इदं दग्ध दग्धाङ्गलौ ॥
चालने गरपडा भरा चाहावे चिक्कति ॥२४॥

Suśruta¹ mentions another pair of śalākā which have their ends shaped like a masūra pulse, and slightly curved ; these are used for the purpose of extracting a foreign body from the external outlets of the body such as mouth, nose, etc. They are eight and nine aṅguli long respectively.

SWAB PROBES.

Six śalākā are used for the purpose of wiping out the principal excretory canals of the body viz., rectum, nose and ears.² Their ends are covered with cotton like a head-dress (pāgḍī). The two śalākā intended for the rectum, have the lengths of ten and twelve aṅguli respectively for short and long distances. So the two varieties of probes for the ears are eight and nine aṅguli long, while the other two kinds of probes for the nose are six and seven aṅguli long respectively. Some commentators are of opinion that these six śalākā are meant for clearing abscesses.

For similar purposes the Greek and Roman surgeons used the spathomele or spatula probe. Priscianus³ writes : "First of all we must frequently wipe away the clots of blood from the nose

¹ See foot note 2, P. 155.

उभेष्वपदमुखे चोतमः शलाकारिकौ ।

मसूरदलवक्ते हे सामान मटनवाहुले ॥२४

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

² कापोन विहितोचोषः शलाकाः पद्मप्रमाणं ।

पायावासाक्त दूरार्थे हे दग्ध वादशाहुले ।

ते पट् समाहुले चार्णे हे कर्णेऽहमवाहुले ॥२५॥

Ibid.

³ Priscianus, xiv.

with the end of a spathomele wrapped on the 'berry' with soft wool, and then occlude it by plugging with wool in the same way."

The use of probes, having the ends wrapped with wool, for wiping out discharge of pus from the ears of horse, is mentioned by Jayadatta Suri¹ in his Treatment of Horses.

SPOON-SHAPED^{*} PROBES.

Three probes are described to have their ends shaped like a khala or mortar with a conical cavity, and so they resemble a spoon. They are to be used for the purpose of applying caustic solutions, etc.²

Similarly eyathiscomele, which is a variety of spathemele in which the spatula is replaced by a spoon, is said to have been used by the Greek surgeons to mix, measure and apply medicaments. The specimens of these instruments occur in the Naples Museum. Sometimes the edge of the spoon is sharp and is recommended to be used as a curette. Scrivenius Largus directs us to use the spoon of an ear specillum for the application of caustics to haemorrhoids.

¹ प्रवस्त्रावेष जानीयात् शोषमध्यनरोऽम् ।

पिनुना देट्विला तु शलाकाये समाहितः ॥

तेन कण्ठानरे पूर्ये कर्षयिता विचक्षणः ।

पालितस्य मुकदस्य पूर्वेन्द्रधूमपिष्ठा ॥

Aṣvavaidyaka, Ch. 34, v. 2. and 3.

^{*} See foot-note 2, P. 155.

NAIL-SHAPED PROBES.

Vāgbhaṭa¹ describes three other probes for the same purpose. They are eight aṅguli long; their ends are bent and resemble in size and shape the nails of the third, fourth, and fifth fingers respectively.

Paul² mentions a nail-shaped probe in the treatment of buboncele. But this was applied as a cautery and not for the application of medicaments. Nail-shaped cauteries are also referred to by Hippocrates³ in the treatment of recurrent dislocation of the shoulder-joint.

JĀMVOVĀUSTHA PROBES.

Three probes are called Jāmvovāustha for their ends are shaped like the fruit of Jambul tree (*Eugenia jambolanum*).⁴ Three other śalākā have their ends shaped like aṅkuṣa or elephant driver's goad.⁵ They may be made of any length required

¹ अटाहृता निवसुखा निस्त्रः चारीपच इमि ।
कर्मीनी-मध्यमा; नामो-नस्त्रमान-समेतमुद्देष्यः ॥

Aṣṭāṅga Hṛdaya Sañhitā, I. xxv.

² Paulus Aegineta, VI. lxv.

³ Hippocrates iii. 15.

⁴ See foot-note 2, P. 155.

शलाका जाम्बवौष्टानं चारीपची च पृथक् लयं ।
युद्धात् स्थूलान् द्रौघानां,

{Aṣṭāṅga Hṛdaya Sañhitā, I. xxv.

⁵ See foot-note 2, P. 155.

For the diagram of the aṅkuṣa see Fergusson's Tree and Serpent Worship; Plate xxxiii., Sanchi, xxxvii., fig. 1, and xxxviii., fig. 1 & 2.

by the surgeon. These six varieties are recommended for the purpose of applying caustic medicaments and the actual cautery.

Paul¹ mentions a gamma-shaped cautery in the radical cure of hernia. This cautery is shaped like the Greek letter Γ; so it resembles the aṅkuṣa cautery of the Hindus. The aṅkuṣa is similar in appearance to the Greek letter.

One variety, which is used for the purpose of removing a tumour from the interior of the nasal cavity, has its end shaped like a khala or mortar, with sharp edges, and of the size of half the stone of the fruit of the jujube tree (*Ziziphus jujuba*)². Vāgbhaṭa³ mentions a similar probe for the purpose of applying actual cautery to a nasal tumour. Its end resembles in shape and size, a half of the stone of the fruit of the jujube tree.

This spoon-shaped probe of the Hindus is comparable to the eurette like sharp cyathiscomele of the Greeks, noted before.

COLLYRIUM PROBES.

For the purpose of applying collyria to the eyes, a rod is mentioned having the length of eight aṅguli and the thickness of a pea. Its both ends are shaped like buds⁴.

The probes for applying collyria to the eyelids, should be six aṅguli long, with a rounded bulbous end. They may be made of gold, or silver, or copper, or iron, or stone. For the habitual use of collyria, a lead probe is prescribed. When medicines are directed

¹ Paul, VI, lxiii.

² See foot-note 2, P. 155.

³ कौलारिक दल तुला स्वा नामाशी, व्युद दाहकन् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

⁴ See foot-note 2, P. 155.

to be applied not only to the lids but also to the conjunctiva, the finger is recommended as it is a softer and safer instrument. Again the probes would vary according to the nature of the collyria to be used. As for the application of lekhana collyrium, the probe should be made of copper and should be ten aṅguli long. The probe is advised to be made thinner at its middle to afford a firm grasp by the surgeon. The ends are shaped like buds. For applying ropāṇa collyrium, a similar probe is to be used, but it should be made of steel; while for the application of a collyrium for the improvement of the visual strength, a probe made of gold or silver, and having the size and shape of a finger is recommended by Cakradatta.¹

Suśruta² likes a probe of steel, or bell-metal, or copper for lekhana collyrium; and of gold, or silver, or horn, for ropāṇa and snehana collyria. The probe should be eight aṅguli long, and the eye is to be kept open and fixed by the left hand, while the right hand is to hold the probe, and so the collyrium is to be applied to the eye.

¹ दशाङुला तनुमध्ये शलाका सुकलानना ॥
प्रशसा लिखने तामो रोपये कालतीहजा ।
चाहूलीव सुवर्णोत्त्वा हयजा च प्रसादने ॥

Cakradatta. Āsehyotana Cikītāś.

² तेषां तु कल्पगुणान्वये विद्याह भाजनान्वयि ।
सौवर्णे राजते याहेन्नाम वैद्युत्काम्बनं ॥
सायसानि च धोज्यानि शलाकान्वय यथाकर्म ।
वक्तव्योऽनुकूलाकारा कलाय परिमुक्तला ॥
चट्टाङुला तनुमध्ये सुकला साधुनियह ।
चौह व्याघ्रजातानि शारीरी च हिता भवेत् ॥

Suśruta Saṃhitā. VI. xviii.

Sāringadharā¹ says: "The collyrium probe should be made of stone or metal. It should be eight aṅguli long and its ends must be made smooth and rounded like a common pea. For lekhana collyrium, a copper, or iron, or stone probe is to be used, while for ropana collyrium the tip of the finger is recommended for its softness."

Of the probes used by the Hindus for applying collyrium to the eyes, fortunately we possess a few specimens. Among the objects of interest found in the excavations at Bijnor, we find, "fourthly, one copper salai or instrument for applying antimony to the eye, similar to those found in the Bihār excavations."²

¹ मुख्योः कुचिता वृक्षा। शलाकाहातुलोन्मिता ।
अग्रमजा पातुजा वा स्थात् कलादपरिमाणता ॥
ताम्बोहासमसंजाता शलाका लेखने सता ।
मुख्यरजतोहुता शलाका रोहने सता ।
अद्भुतीय सदृशेन कथिता रीपवि दुधे ॥

Sāringadharā Saṅgraha, III. xii.

Yogaratnākara. Eye Diseases. P. 523.

चिकन सलिलयोगे भद्राचटवे च
इविषि च विपक्ष्ये चीर वाङ्गि रभूयि ।
प्रतिदिनस्य तत् सुनधा मौषसेक
प्रभिहितमय पचान् कारयेत् तच्छलाकाम् ॥
मवितुषादयकालि माज्जना अप्पना वा
करकचिकमेतान्द्येपित्तिरोगान् ।
अमितनित गम्भ्यान् गम्भिवद्याभिज्ञातान्
इरति नयनरोगान् सिवमाना शलाका ।

Cakradatta, Netraroga Cikitsā.

¹ ² Vide Princep's (Thunna's) Indian Antiquities, fig. 18, pl. iv" J.A.S.B., IX. 1, 7.

Specillum with two olivary ends formed a variety of probe of the Greek and Roman surgeons. It was used as an ordinary probe in dealing with crooked fistulae, and as a cautery to destroy the roots of hairs after epilation. Sometimes it carried an eye in one of its olives and was used in the treatment of nasal polypus. The eye was threaded with a cord having many knots along it. The other end of the probe was pushed through the nose and withdrawn by the mouth, and then by a sawing movement of the cord with both hands of the surgeon, the polypus was removed.¹ A single probe for the application of semi-solid medicaments, occurs in the outfit of the oculist of Rheims, in the museum at St. Germain-en-Laye and is figured by Milne.²

KARNA-ŚODHANA OR EAR-CLEANER.

This Salākā is said to have its end shaped like the end of a leaf of Aśvattha (*Ficus religiosa*). The instrument looked like a srūva—one of the famous spoons used in sacrificial ceremony.³ It was used for the purpose of extracting wax from the ears.

The different kinds of spoons used in the ancient Hindu ceremonies were as follows: "Three different srūvā or offering-spoons are used *rīz*, the guhn, upabhrīt and drubha. They are made each of a different kind of wood, of an arm's length (or according to others, a cubit long) with a bowl of the shape and size of the hand, and a hole cut through the bark and front

¹ Paul VI, lxxxvii, VI, xiv, VI, xxv.

² Greco-Roman Surgical Instruments, pl. xii, fig. 5.

³ कर्णशोधनं मन्त्रत्वं पव ध्रानं सूचानन् ॥

side of the bowl and fitted with a spout, some eight or nine inches long and shaped like a goose's bill. The sruva or dipping-spoon, on the other hand, chiefly used for ladling the clarified butter (or milk) from the butter vessel into the offering-spoons, is of the khadira wood (*Acacia catechu*), a cubit long, with a round bowl measuring a thumb's joint across and without a spout".¹

So we see that the bowl of the *karma-śodhana* was round in shape.

Suśruta also mentions a *śalākā* for the extraction of cerumen or minute insects from the ears.² Cakrapāṇī³ alludes to it. In modern times, the ear-cleaner, as used commonly in India, is a *tāla* yantra. Ear specillum is frequently mentioned by the Greeks and Romans. It consisted of a small narrow scoop at one end and a simple probe at the other. The use of the scoop is thus described by Archigenes⁴: "If a bean, stone, etc. fall into the ear, remove it with the small narrow scoop of the ear specillum". Celsus⁵ directs us to extract a scab or cerumen by means of the ear specillum.

The ear scoop used by the modern surgeons is a narrow scoop, more like the Hindu *pūjā* vessel known as *kuśi*. The ear scoop is often made in combination with a director.

¹ Satapatha Brāhmaṇa, Sacred Books of the East, I. 3. 1. 1. foot-note.

² See foot note 1, P. 140.

³ शेदविला तु तेजेन चरदेन प्रविलाप्य च ।

गोधयत् कर्णगृदन्ते भिषक् सम्यक् मस्ताक्या ॥

Cakradatta, Karpāroga.

⁴ Galen, XII, 652.

⁵ Celsus, VI, viii.

GARBHA-ŚĀNUKU. FETUS OR TRACTION HOOK.

The end of this instrument is said to have been bent like aīkuśa or elephant driver's goad. It is described to have the same length as the other śānuku have *i. e.* ten to sixteen aṅguli, and it is eight aṅguli in width.¹ It is recommended for extracting a dead foetus from the mother's womb, after perforating its head by the maṇḍalāgra or mudrikā knife. Suśruta recommends us to perforate the head and then to extract the bones by the śānuku or hook, and lastly to apply traction by fixing it about the chest or axilla. If the head can not be perforated, it is to be applied to the eyes or cheeks.²

Traction hook for extraction of a dead foetus was well known to the ancients. Hippocrates³ bids us break up the head of the foetus with a cephalotribe and remove the bones with bone forceps, or deliver it by a traction hook inserted near the clavicle. Celsus⁴ advises us to insert a smooth hook with a short point and to fix it in the eye, or the ear, or the mouth, or the forehead, and so the foetus is to be dragged down. Soranus points out the best places for the insertion of the hook to be the eyes, the occiput, the mouth, the clavicles, and the

¹ नतोदये शङ्खना तुल्यो मम शङ्खरितिकृतः ।
अटाह्नुला यतकेन सूडगम्भे हरित् लियाः ॥ १६ ॥

Aṣṭāṅga Hṛdaya Saṃhitā I. xxv.

² तत् लियनामास्य मधुलीयेषाहुलीश्वर्णेषां वा शिरोविदाऽथ शिरःकपालान्माहुल्य शङ्खना
सहोत्रोरसि कचायां वापहरेदभिन्ने शिरसि चाचिकृते गच्छे वा ।

Suśruta Saṃhitā. IV. xv.

³ Hippocrates. II. 70.

⁴ Celsus. VII. xxix.

ribs in head presentations; and the pubes, ribs, and clavicles in footling cases.¹ Soranus, Aetius² and Paul³ direct us to extract the fetus in the same way but they recommend us to use two hooks instead of one, in order that the pulling may be straight down and not to one side.

Albucasis,⁴ Rhases,⁵ Haly Abbas,⁶ and Avicenna⁷ give similar directions for opening the child's head and for delivering the fetus with hooks.

This purpose in modern times is served by the blunt hook and crotchet.

YUJSA-SASCU OR MIDWIFERY FORCEPS.

An instrument is thus named and figured by modern writers on Hindu surgery, bearing some resemblance to the modern forceps, for extracting the child alive. We have, however, no mention of any such instrument in the works of Caraka, Sušruta Vāgbhata and other ancient authorities. The Greeks and Romans were also ignorant of it; and the Arabians fared no better, though Adams, in his commentary on Paul⁸ asserts that Avicenna refers to forceps for the delivery of living children. Mulder, in his valuable work,⁹ gives an extract from a translation from the works of Avicenna supporting

¹ Soranus II. xix.

² Aetius IV. iv. 23.

³ Paul VI. lxxix.

⁴ Albucasis. Chirurg. II. 76 and 77.

⁵ Rhases. Cont. xxii.

⁶ Haly Abbas. Pract. ix. 57.

⁷ Avicenna. iii. 21, i. 24.

⁸ Paus. Aeginita. III. lxxvi.

⁹ Hisp. Forceps et Vecticum. p. 6.

the same conclusion. Smellie¹ says : "With regard to the fillets and forceps, they have been alleged to be late inventions ; yet we find Avicenna recommending the use of both. The forceps recommended by Avicenna is plainly intended to save the fetus". "He recommends all the old methods for assisting in natural labours ; and if the woman can not be delivered by these, he orders a fillet to be fixed over the head : if that can not be done, to extract with the *forceps* ; and should these fail, to open the skull ; by which means the contents will be evacuated, the head diminished, and the fetus easily delivered."² Playfair³ also holds the same view. The point is however by no means settled. For Milne⁴ says : "A full consideration of Avicenna's words seems to me to lead to the conclusion that he is describing no more than extraction with a craniotomy forceps. If the forceps fail, the child is to be extracted by incision, as in the case of a fetus already dead (and decomposed so that the forceps would not hold)."⁵

Thus we may be sure that there is no available evidence of the use of delivery forceps by the Hindus, Greeks, Romans and Arabs ; and the Chamberlens are still the undisputed claimants to the glory of the invention.

But there is no doubt that the Hindu surgeons tried extraction of the living fetus by manual traction. The hands are recommended to be well oiled and introduced into the uterus. If the child be dead, sharp instruments are advised to be intro-

¹ Smellie, Treatise on Midwifery, p. 40.

² Ibid, Edited by McClintock. New Syd. Soc, vol. I. Introduction p. 50.

³ Researches on Operative Midwifery, p. 10.

⁴ Dr. R. Milne's Surgical Instruments, p. 150.



duced into the vagina for cutting upon the fetus. But on no account such instruments are to be used so long as the child is alive.¹

SARPA-PĀNĀ OR SNAKE'S HOOD.

It is also called *agra-bakra* i. e. the end bent. It is a ūṇku or hook similar to the above, the end being bent like the hood of a snake.² It is to be used for the purpose of extracting stone after operation.

2. Suśruta, in the operation for extraction of stone through the perineal incision, directs us to use the *agra-bakra* to bring the entire stone out of the wound. But in the case of females, he recommends us to use a knife having a spoon like a scoop, to prevent the formation of a vescico-vaginal fistula.³ Is it a spoon-shaped knife, or is it a double instrument on a handle—a knife at one end and a scoop at the other? The Greeks used a knife having a scoop at the end.

१ गर्भ जीवति सूर्दं तु गर्भ घबे न निर्हरेत् ।
इसेन सर्पिषाक्षेन योनेरनगतेन सा ॥
सते तु गर्भे न भिन्ना योनी शब्दं प्रवैशयेत् ।
मस्तकामार्बविदृष्टी लक्ष्यहस्ता भयोजित्वा ।
मवेतनं तु शस्त्रेन न कथचन दारयेत् ॥

Yogaratnākara, Muḍgalsāra Pīkītsā.

* अग्रमयोङ्गरणं सर्पफलाकावदकं अयतः ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

* यथा च न भिन्नेन न चूर्णे ते वा तथा प्रपनेत चूर्णमन्त्यमध्यवस्थिते हि पुनः परिहितमेति तथात् समस्तामपवक्ते याइदीत । न्दीकाम् वक्तिपाच्छन्तो गमदंशवः सविक्षणः तथाक्षा समुत्सङ्गवच्छम्य पातयेदतोऽन्तथा स्त्रामां सूचसादौ ब्रह्मो भवेत् ।

Suśruta, Saṃhitā, IV. vii.

Celsus¹ describes the extraction of stone through a perineal section by means of the lithotomy scoop. "The scoop is slender at the end and flattened out in the shape of a semi-circle, smooth externally where it comes in contact with the tissue, rough internally where it meets the calenlus". It was a long hook-like instrument.

Aetius² mentions a special stone extractor, under the treatment of calculus in the female. Some understand by it the lithotomy forceps.

In modern times we use the lithotomy forceps and scoop for the same purpose.

I take this opportunity of referring to the celebrated passage in the famous Hippocratic oath, which runs as follows: "I will not cut persons labouring under the stone, but will have this to be done by men who are practitioners of this art". This sentence has given a good deal of trouble to the commentators and they have failed to understand the true reasons as to why Hippocrates specially forbade the practice of this operation. "M. Littré finds some difficulty in accounting for the circumstance that the noviciate in surgery is interdicted from the operation of lithotomy." Adams,³ commenting on the sentence, says: "Why this operation was proscribed, can not indeed be satisfactorily ascertained," and he quotes the Arab Physician, Avenzoar⁴, who "pronounces the operation to be one, which no respectable physician would witness, and far less to perform."

¹ Celsus. vii. xxvii.

² Aetius. IV. iv. 94.

³ The Genuine Works of Hippocrates. Vol. II. P. 777—8.

⁴ Avenzoar. II. 2, 7.

The explanation that this was proscribed because there were men who devoted themselves exclusively to this kind of treatment, and that if the qualified surgeons be allowed to practise the operation, they would interfere in the sphere of action of the lay lithotomists, cannot be considered satisfactory. For the question still remains the open one, why should Hippocrates proscribe this operation from the domains of scientific surgery, simply because a few laymen happened to practise it.

The real explanation is that in Hippocrates' time success in the operation was very difficult to achieve, consequently he interdicted the operation much in the same way as abdominal operations were considered sacred before the days of antiseptic surgery. It is curious to find that Suśruta calls this operation the worst of all surgical operations, for he says¹: "Even experienced and able surgeons fail to attain success by operation for the stone. So the surgical treatment is the worst of all treatment here. But if you do not operate, the patient will die; and it is doubtful whether he will live after the operation; so give him the chance of operation in God's name." I do not know whether this passage of Suśruta has any causal relation to the remarks of Hippocrates, but there is no doubt that the former serves as a better commentary on the latter, than anything hitherto suggested.

Adams² says that this operation was practised by a class of men,

¹ कुर्वन्नामपि वैद्यस्य यतः मिहिरिषाध्वं च ।
उपकर्मो अच्छोऽयमतः स परिकौर्तिः ॥
अक्रियायां भ्रूवी मृत्युः कियायां संशयो भवेत् ।
तथादापृष्ठका कर्त्तव्यानीश्वरं साधुकारिणा ॥

Suśruta Saṃhitā, IV. vii.

² Commentary on Paulus Aegineta, Vol. II. P. 263.

separate from the surgeons, in all countries in ancient times, and points out that the ancient operation of lithotomy is still practised with great success by the native doctors of Hindusthan. No conclusion is, however, to be drawn from the modern practices in India, as we find separate classes of men not only for stone, but also for bone-setting, cataract, etc. And whatever may be the practice in modern times, we find that during Suśruta's time, the operation was not the privilege of the laymen.

ŚARAPUṄKHA-MUKHA PROBE.

This instrument is also described to have its end bent like the hood of a snake. It is four aṅguli long and is recommended to be used for the purpose of extracting a tooth from its socket.¹

Tooth elevator or instrument for levering teeth is mentioned by Galen.² It is of the same size as the bone lever which, according to Paul,³ is seven or eight aṅguli long.

This instrument resembles in shape and action the tooth elevator of the modern surgeons.

ARDHACANDRA-MUKHA ŚALĀ. HALF-MOON PROBE.

The first half of this variety of śalā is curved like a half-moon, to which is attached the second half as a rounded handle.⁴ Suśruta advises us to use it for the purpose of applying actual

¹ शरपुङ्क्ष मूलादातने चतुर्हालम् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxv.

² Galen, xviii, 563.

³ Paulus Aegineta, VI, cxi.

⁴ शलाकामनवयम् नि ।

श्वीकृ हसदद्वाव मूले चार्हन्दुसङ्गिभां ॥

Aṣṭāṅga Hṛdaya Saṃhitā I. xxv.

cautery to the groin in buboneele, to prevent the hernia from entering into the scrotum.¹

A crescent-shaped cautery was also used by the Greek and Roman surgeons. So Paul² says that in cases of sloughing of the prepuce we must cut it off and use lunate cauteries to stop hemorrhage and prevent the spreading of the wound. Again he mentions a cautery shaped like the Greek letter Γ, in the radical cure of hernia.³

BONE LEVER.

Instruments for levering fractured bones into their proper positions are mentioned several times by Suśruta. In the treatment of fracture of the nasal bones, a śalākā is recommended to be used as a bone lever for raising and depressing the fractured ends.⁴ Sometime a muṣala or pestle is advised to be used.⁵ It is a thick wooden pestle the end of which is plaited with iron. It is still used to strike upon paddy to separate the husk from the rice. Suśruta mentions its use to reduce dislocations of the joints of the shoulder and neck.⁶

¹ तत्र या वङ्गस्था ता: दक्षेदृश्नुवक्त्या ।

सम्भूतामग्निवरोधार्थं कोषप्राप्तां तु वर्जयेत् ॥

Suśruta Saṃhitā, IV. xix.

² Paulus Aegineta. VI. lvii.

³ Ibid. VI. lxii.

⁴ भासां मद्रां विकृतां वा चक्षौ तृत्वा शलाक्या ।

Suśruta Saṃhitā, IV. iii.

⁵ सत्रसुत्रमवृत् चित्रमवक्त् सूपलिण् तु ।

तथीश्वरं पीडवेष्व वभीयाहादमेव च ॥

Ibid.

⁶ तेजपूर्वं कटाहं वा डोखां वा शाव्यद्वरं ॥

मूषकनीतिविषयं काचामाससम्बै विसंहते ।

स्थानास्त्रितव्य वृद्धीत लसिकेन विचचणः ॥

Ibid.

The pestle was also used by Hippocrates¹ to reduce dislocation of the shoulder joint. He says: "Those who accomplish the reduction forcibly bending it round a pestle, operate in a manner which is natural. But the pestle should be wrapped in a soft shawl (for thus it will be less slippery), and it should be forced between the ribs and the head of the humerus. And if the pestle be short, the patient should be seated upon something, so that his arm can with difficulty pass above the pestle. But for the most part the pestle should be longer, so that the patient when standing may be almost suspended upon the piece of wood. And then the arm and forearm should be stretched along the pestle, whilst some person secures the opposite side of the body by throwing his arms round the neck, near the clavicle"

The bone lever used by the Greeks is thus described by Paul:² "It is an instrument of steel about seven or eight fingers' breadth in length, of moderate thickness that it may not bend during the operation, with its extremity sharp, broad and somewhat curved."

DIRECTOR.

Suśruta³ mentions the use of eṣāṇī or metallic probes not only to ascertain the course of the fistulous track but also to raise the bridge of skin covering the sinuses, so that the surgeon may operate on it as a guide. Cakradatta⁴ also uses a probe to

¹ The Genuine Works of Hippocrates. Adams' Trans. p. 372.

² Paulus Aegineta, Vi. cxi.

³ पक्षेषु चोपस्थितमवगाहस्त्रिंशत्यादौ सद्विवेदाश्चसमित्र वलयित्वा भग्नदं सनीका परादौनमवाचीनं वा वहिम्बुद्धमन्तर्मुखं वा ततः प्रणिधायैष्योमुकुत्रम्य साश्रयमुत्तरेच्छन्देण Suśruta Saṃhitā, IV. viii.

⁴ नाडीना गतिमन्त्रिष्य श्लेनापात्तु कर्मदित्।

Cakradatta, Nadiivraya Cikitsā.

learn the direction of the wound before operation. It is also mentioned in the *Yogaratnākara*.¹

In the treatment of fistulae, Celsus² also says: "A director being inserted into them down to their termination, the skin ought to be incised." It is not mentioned that the *esanj* or probe was grooved, but there is no doubt of its use like a grooved director, so common nowadays. The discovery of such a director, along with several other surgical instruments, which are preserved in the Musée de Cinquantenaire, Brussels, proves that it was known to the Romans.

URETHRAL PROBE.

A variety of *śalākā* is described by Suśruta³ to have its end rounded like the stalk of a *mālati* flower (*Echites caryophyllata*, Rox.) It is to be used for cleaning the urethral canal.

Caraka⁴ mentions a probe for examining the direction of the urethral canal and its pathological condition, before introducing the tube of the urethral or bladder clysters into it.

¹ नाहीनो गतिमन्वैत्य शलो शोत्रपात्रं कर्मचित् ।

Yogaratnākara, p. 346.

² Celsus, VII. iv.

Graeco-Roman Surgical Instruments, p. 73.

³ मुवमार्गविशीधनादै एकं मालनोपयुक्तलायप्रसाणं परिसङ्गलमिति ।

Suśruta *Saṃhitā*, I. vii.

⁴ क्षेत्रोः सुखोपविष्टस्य हटे भेदे इताचिते ।

शलाकयाचित्य गतिं यथाप्रतिहता व्रजेत् ॥

ततः शेषःप्रसाणेन पुष्पनेत्रं प्रविशयेत् ॥

Caraka *Saṃhitā*, VIII, ix.

Class VI. The Upayantra or Accessory Instruments.

The sixth class of the blunt instruments comprises the upayantra or accessory instruments. By surgical instruments, the Hindus consider not only the instruments proper, but also any mechanical aid by which the object of the surgical treatment is attained. Thus even medicinal agents are considered under this head for they help the inflammatory swellings to subside, or suppurate, or burst open as by various external applications. The accessory instruments are :

1. RAJU OR THREAD.

As an example of thread being used as an instrument of surgery, we know that the thread smeared with caustics are recommended by Suśruta¹—kṣāra sūtra or caustic thread—for the operation of fistula-in-ano. For further informations on the subject see “Eṣāṇī or sharp probes” under the Śāstra.

Thread as a material of phalavarti or tent is mentioned by Sārṅgadhara.² If after a vaginal or intra-uterine douche, the injection does not flow out, he advises us to introduce a strong tent made of thread, dipped in oleaginous medicines of the

¹ क्षारदुर्जनमौकर्णि नाडीमस्मिताव या ।

चारसूत्रं किन्दावत् गतेण वृहिमान् ॥

Suśruta Saṃhitā, IV, xvii.

Cakradatta, Nāṭīvraṇa Cikitsā.

² फलवर्ति निदध्यादा शोनिमार्गे हड़ मिथक् ।

नृत्वैदिनचिंतां सिंचो शोधनद्वयसंयुताम् ॥

Sārṅgadhara Saṃgraha, III, vii.

Sodhana (Purifier) group. Cakradatta¹ uses caustic threads in the treatment of piles by ligature.

2. VENIKĀ OR TWINE.

The use of twine as a ligature to be applied above the part bitten by a snake to arrest the circulation of blood towards the heart is mentioned by Suśruta.² Caraka³ also advises us to tie ligatures above and below the bitten part, then to squeeze out the poison towards the wound, whence it is to be drawn out through incisions made by a knife.

3. PATTĀ OR BANDAGES.

For the proper application of bandages, Suśruta mentions the following materials to be necessary :⁴ viz., cloth manufactured

¹ भावितं रज्जनीचूर्णः; खुशीचोरे पुनःपुनः :

वस्त्रान् सुट्टरं सूतं भिनतामौ भग्नदरं ॥

Cakradatta, Arīaroga Cikitsā,

² सा तु रज्जादिभिर्वा विषप्रतिकरीमता :

Suśruta Saṃhitā, V. v.

³ दंशात् तु विषं दष्टस्य विसर्ते वेणिकां भिषक् वहा :

निष्ठो डेवेन्ध्रणं दंशमुदरेन्द्रणं वज्रम् ॥

Caraka Saṃhitā, VI. xxv.

⁴ अत कै जगवस्तन द्रव्याभ्युपदेशामः । तदथा चौमकापांसविकटहत कौमेय पर्वीर्ण चौमपद्युच्छम्बान्त्यलक्ष्मानावृशकलनता विद्वत्तरन्तु त्रुतफलसनानिका लौहानीति तेषो व्याधि काले चविलोपयोगः प्रकरणतर्व घामादेशः । तत्र लोगदामसभिकान्वैष्णवप्रतोली-मण्डलस्थिकायमकस्तु चौमविवर्विताननोफगः पञ्चाङ्गै चेति चतुर्हश्वस्वविशेषाः ।

तेषां नामभिरेवाकृतयः प्रायेणायास्याताः । तत्त्वकोशमहु त्राङ्गुलिपञ्चमु विद्यधात् । दाम सम्बाधितः । सम्बिहु दक्षमानानाशतलकर्णय स्वसिक्षः । अनुवैतितनु शास्त्राम् । योषामेत्योः प्रतीतोः । उत्तेऽस्तु भवते । चहु त्राङ्गुलिमेत्रुयेषु अयिकाः । यमनव्रगायो यमकः । हनुयादगणेषु खट्टोः । अपाङ्गीयोर्योः । पृष्ठदरोरमु विवर्मः । मूर्णिं विसानो चिदुकनामीत्रां सवसिषु गोकर्णां । जतुषाकर्ते पश्चाङ्गीभिति । यो वा यश्चिन् गरीय प्रदेशे मुविविद्वे भवति ते तत्त्वान् विद्यधात् ।

Suśruta Saṃhitā, I. xviii.

from the fibres of plants, flax, cotton, wool, blankets, silk, leather, Chinese cloth, inner barks of trees, bark of bottle gourd (*Cucurbita lagenaria*), tendrils of twining plants, cane or pieces of split bamboo, rope, fruits as those of *Bombax Malabaricum*, blades of knives, and plates of metals as gold, or lead, or iron. These articles should be used with due consideration as regards the nature of the disease, the time of their use and the purpose in hand. He describes fourteen varieties of bandages as follows :—

1. *Kośa* :— a hollow cylinder or sheath to be applied to the joints of the thumb and fingers. This form of bandage is to be applied over the stumps after amputation of the limbs.

2. *Dāma* (*i.e.* tail of a quadruped?) :— it is a large bandage to be tied round a part for the relief of pain or cramps.

3. *Svastica* or a circular cross-bandage :— it is to be applied round the joints, the space between the tendons of the great and second toes, the intermammary region, the glabella (space between the eyebrows), the plantar surfaces of the feet, the palmer surfaces of the hands, and the ears. It is also the form of bandage recommended in dislocations of the shoulder joint.

4. *Anuvellita* or an encircling bandage :— it is to be applied to the limbs. This form of bandage is recommended to be applied to the limbs in cases of oblique, deep, and large cuts inflicted by a knife. A leather bandage applied in the form of *gophaṇa* would also serve the purpose. The encircling bandage is also advised in cases of fracture of the ribs.

5. *Protoli* :— a broad bandage for the neck and penis.

6. *Maṇḍala* or a circular bandage :— it is to be applied to

the round parts of the body such as the arms, sides, abdomen, thighs, and back.

7. Sthagikā or a supporter:— a bandage enclosing a splint and pastes of medicaments to keep the parts firm. It is to be applied over the ends of the thumb, fingers, and penis. Suśruta directs us to use this bandage round the serotum after tapping the hydrocele.

8. Yamaka or a double-bandage:— a pair of circular bandages applied to a couple of ulcers on a part.

9. Khatvā or a four-tailed bandage:— it is recommended for the temples, cheeks and lower jaw.

10. China or a banner bandage:— a bandage for the inner angles of the eyes.

11. Vivandhana or a circular chest-bandage:— it is the bandage for the back, abdomen and chest.

12. Vitāna or a canopy bandage:— a large bandage for the head.

13. Gophaṇā¹ (*lit.* a sling for throwing stones):— a concave bandage for the chin, nose, lips, shoulders and pelvis.

¹ शास्त्राम् प्रतितां लिंगंक् प्रहारान्विडतान् भृशः ।
सौन्दर्ये न सम्प्रिवेद्वाग् सम्यक्षीवनुपूर्वजः ॥
वदा ईङ्गितकेनाग् ततकैलेन सेचयेत् ।
चर्मना गोफणावन्धः काण्डो यो वा हितो भवेत् ॥

Suśruta Saṃhitā, IV. ii.

पादो निरसासुभव्य अलेन गोप्त्वा चाचिषी ।
प्रवेश्व तु द्विवेद्वा मुकौ सौविषतः परं ॥
काण्डो गोफणिकावन्धः कव्यामावेश्व यनकं ॥

Ibid., IV. ii.

14. Pañcāngī or a five-tailed bandage¹ :— it is intended for the parts above the clavicle, as in the dislocations of the lower jaw. Caraka² mentions a bandage called kavalikā, to be tied tightly after setting a fracture or reducing a dislocation. It is so-called from the medicinal paste which is applied to the affected parts, underneath the splints.

Dunglison mentions a bandage called Accipitar to be applied over the nose. It is so called from its likeness to the claws of a hawk. It resembles the pañcāngī bandage of the Hindus.

So the bandages are recommended to vary according to the different parts of the body ; and the surgeon, using his discretion, is to select the form of bandage suitable to the part. The bandages are recommended to be firmly secured to their place by three strings, applied upwards, downwards and obliquely. The knot is avoided over the seat of ulcer and tied on a side.

Suśruta says : "Bandages are applied with three degrees of tightness according to the seat of the abscess :—
 1. A tight bandage causes uneasiness but not actual pain ;
 2. A loose bandage is loose and relaxed ; 3. An even bandage is properly applied—neither tight nor loose. The tight bandage is to be applied to the buttocks, sides of the abdomen, axilla, groin, chest and head. The eyes and joints

¹ हन्तस्थिनी समानौय हनुसन्धीं विसंहते ।

सो दयिता स्थिने सम्यक् पदाङ्गीं वितरेहिष्कृ ॥

Suśruta Saṃhitā, IV, iii.

² अस्थिमग्रं च्युतं सुन्धि संदधौतं समं पूनः ।

समेन सममडेन लतान्देन विचच्छा ॥

स्थिरैः कवलिकावस्थैः कुशिकाभिष्ठ सम्प्रितम् ।

पटैः प्रभृतं सपिञ्चक्षेप्त्रीयादवले सुखः ॥

Caraka Saṃhitā, VI, xiii.

are loosely bandaged. The even bandage is for the extremities, face, ears, neck, penis, scrotum, back, sides, and abdomen.¹

Suśruta next deals with the alterations in the mode of applying bandages according to the rules laid down. He also advises the surgeon to be guided by the dictates of his common sense. He directs us to practise bandaging on the various large and small limbs of a human figure made of cloth or clay.²

With regard to the mode of application of bandages, Hippocrates says:³ "It should be done quickly, without pain, with ease and with elegance, it should fit well and neatly. The forms of it are the simple, the slightly winding (called ascia), the sloping (sima), the monoenclus, the rhombus, and semi-rhombus".

The whole chapter of Suśruta is very interesting and will repay perusal. If bodily transferred, it will adorn any modern text book on surgery.

As it is very difficult to convey a correct idea of these bandages in words, I have given figures of them from modern works on surgery, from which their construction and uses will be readily understood at a glance.

¹ तत्र व्रणायतनविशेषाद्यन्व विशेषमितिविधोऽभवति गाढः समः शिखिल इति ।

पौड़यप्रकृतीं गाढः सोच्चासः शिखिलः धूतः ।

नेव गाढी न शिखिलः समोवस्थः प्रकीर्तिः ।

तत्र चिक् कुचि कवचहेतोः शिरः सुगाढः । गास्त्रावदन कर्णकण्ठमेत्तमुखपृष्ठपात्रोऽदरस्म समः । अच्छीः सन्धिषु च शिखिल इति ।

Suśruta Saṃhitā, I. xviii.

² पुक्षमय पुक्षाह प्रत्याविशेषेषु वस्त्रयोग्याः ।

Ibid., I. ix.

³ The Genuine Works of Hippocrates, Vol. II, P. 477. Syd. Soc. Ed.

ABDOMINAL BINDER.

Caraka¹ mentions the use of abdominal binder for the recently delivered woman to prevent derangement of air by its expansion in her abdomen.

Dr. Barnes says:² "The sudden expulsion of one-tenth of the body-weight from the abdominal cavity is attended by a sudden removal of a force hitherto pressing upon the vessels and organs of the chest, abdomen, and pelvis. This entails in some cases a tendency to vacuum. Hence disturbance of the circulation. Now the binder, by supporting the abdominal walls, restores the equilibrium of pressure. The pressure exerted upon the uterus works as a gentle continuous stimulus to contraction. The woman is conscious of the support and is grateful for it. The figure, so precious, and rightly so, to women, is better preserved So applied, the binder becomes one of the most efficient agents in antiseptic midwifery; it keeps the walls of the uterus and vagina in contact, thus preventing the collection of fluids or clots, and shutting out air".

The use of cloth for other surgical purposes is also mentioned :—

FIELD HOSPITAL.

The cloth is to be used for the manufacture of tents for the doctors to live in. The wounded in war are to be treated in such tents. The tent of the surgeon-general should be close to that of the king in the battle-field.³

¹ वैष्ट्येददर्श महता वाससा तथा समा न वायुसदर्श विक्रितिमुपादयनवकाशतात् ।

Caraka Samhita, IV. viii.

² Obstetrical Medicine and Surgery, Vol. II, p. 87.

³ लक्ष्मावारि च महति राजशेहादनकारे ।

भवेत् चत्तिहितो वैद्यः सर्वोपकरणान्वितः ॥

Small tents are also recommended for applying vapour bath to patients.

DRESSINGS.

Dṛḍhavala¹ mentions the use of medicated gauzes to be used as sponge by the females and says : "In discharges from the vagina, pieces of cloth soaked in decoction of barks of Vata (*Ficus Bengalensis*) and Lodha (*Symplocos racemosa*) and dried, should be put inside the canal."

In the *Mohāvāgga*² we find the use of itch-cloth :— "I allow, O Bhikkhus, to whomsoever has the itch, or boils, or a discharge, or scabs, the use of an itch-cloth".

"According to the 90th Pakittiya such cloth must not be more than four spans in length and two in breadth."³

I can not help quoting from *Mohāvāgga*,⁴ another discourse of Buddha as it shows clearly the surgical treatment of boils in ancient times :—

Now at that time a certain Bhikkhu had boils.

"I allow, O Bhikkhus, the use of the lancet".

Decoctions of astringent herbs were required.

"I allow, O Bhikkhus, 'decoctions of astringent herbs'.

Sesamum salve was required.

तत्र स्त्रीमनं वज्रवदाशः स्थाति समुक्तिं ।

उपसर्पेन्द्रिमोहेन विषशल्यासयद्वितीया ॥

Suśruta Saṃhitā, I. xxxiv.

¹ लघुधृतक् रुपायेण लीघकल्पक् तथा पितैत् ।

आसाव चौमपह वा भावितं तेऽनुधारयेत् ॥

Caraka Saṃhitā, VI. xxx.

² *Mahāvāgga*. VIII. 17, 2.

³ *Ibid.* VI. 14, 4 & 5.

"I allow, O Bhikkhus, the use of sesamum salve".

5. Compresses were required.

"I allow, O Bhikkhus, the use of compresses."

It was necessary to tie up the sore with cloth.

"I allow, O Bhikkhus, the use of bandages for tying up wounds".

The sore itched.

"I allow you, O Bhikkhus, the sprinkling of a sore with mustard-powder".

The sore became moist.

"I allow you, Bhikkhus, to fumigate (the sore)."

Proud flesh formed on the wound.

"I allow you, O Bhikkhus, to cut off (proud flesh) with a lanceet".

The wound would not close up.

"I allow, O Bhikkhus, the use of oil for wounds".

The oil ran over.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of fine rags, and of all kinds of ways of treating wounds".

If the object of fumigating the sore was to sterilize it, as it certainly was, we may take this dialogue as the best sketch of the scientific treatment of boils,—remembering that it represents the knowledge of surgery more than 2500 years ago.

Cakrapāṇi advises us to tie the ends of the hairs of a patient, by a piece of cloth,¹ before performing phlebotomy on the vessels of the head and neck.

¹ स्त्रूपहातकेशानो जानुस्थापितकपरः।

4. CARMA OR LEATHER.

The use of leather in ancient medical practice in India was manifold.

Leather bandage.

Straps or belts of leather were used as bandages. Suśruta¹ advises us to apply the leather bandage in cases where more than half the thickness of the upper or lower extremities are cut by some sharp instruments in a slanting direction. Then the parts of the wound should be well adjusted, the bone and the soft parts kept in apposition, and the wound closed by sutures and well covered by dressings, over which the leather bandage is to be applied in the form of a gophaṇā or sling.

Leather bandage in the form of gophaṇā is mentioned by Suśruta² to be applied over the anus to prevent recurrence of procidentia of the rectum. The prolapsed bowl should be well bathed with ghee and fomented; and then reduced by gentle pressure. There should be a hole in the bandage just in front of the anus to allow flatus to pass out. Vṛnda³ alludes to it. Similarly the modern surgeons use a pad supported by a bandage as an aid in

¹ See foot-note 1, P. 178.

² गुदमध्ये गुदे स्त्रियों के हाथों प्रयोग्यतः ।

कारवैद्यनोफलावस्था मध्यचिकित्सा चकेणा ॥

Suśruta Saṃhitā, IV, xx.

³ गुदमध्ये गुदे स्त्रीरक्षणाः ग्रहण्यतः ।

प्रविष्ट व्यवहारापि वह गोः फलावस्था भूषणम् ॥

गोः फलावस्था । गोः फलावस्था वस्त्रविशेषः ।

नक्त हि—उच्चान्तिर्माय मध्यचिकित्सा उपर्यावस्था चाल्य गोः फलावस्था कार्य इति ॥

preventing descent of the gut. It is mentioned also in the Cakradatta¹ and the Yogaratnākara.²

Dṛḍhavala mentions the use of a piece of untanned leather to be applied over a layer of ointment during the day, while during the night the leaf of Eranda (*Ricinus communis*) is directed to be used.³

LEATHER LIGATURES.

In the treatment of snake-bite, a ligature is advised to be used above the seat of injury to stop the circulation of poisoned blood. This ligature is advised to be made of leather, or braided fibres of trees, or soft cord of jute, etc.⁴

YANTRA-SĀTAKA. LITHOTOMY STRAP OR BINDING APPARATUS.

This is the name of the leather shackle, which is recommended to be used during the operation for stone in the bladder. The patient should flex his knees and elbows; and the parts are to be

¹ गुदमंडे गुदे स्नेहैरभवाऽय प्रवेशयेत् ।

प्रविष्टे स्वेदयेत्तापि बहु गोःकथया हडम् ॥

Cakradatta, Kṣudraroga Cikitsā.

² गुदमंडे गुदे स्निग्धे क्षेत्रानाक प्रवेशयेत् ।

प्रविष्टे रीघवेदयत्तादन्यसच्चिद्र चर्मना ॥

Yogaratnākara, P. 343.

³ परस्परपूर्वे प्रक्षाय रात्रौ कल्यं दिमोचयेत् ॥

चौराम्बूचा ततः मित्रं पुनर्वैवोपनाहितम् ।

सुचेद्रात्रौ दिवावद्व चर्मभिय सुलोचनम् ॥ ४४ ।

Caraka Saṅhitā, VI. xxviii.

⁴ सर्वेरेवादितः सर्वः शास्त्रादप्य देहिनः ।

दंशस्त्रोपरि वस्त्रीयादरिदायतुराहुते ॥

द्वौतवर्णान्-वलक्षणान् हटुनावस्थेन च ।

न गच्छति विषे देहमरिष्टाभिनिवारितं ॥

Baṇarasa Saṅhitā, V. 7

ties together by this instrument.¹ Similarly, it is to be used during the operation for piles; but then, according to Suśruta,² the neck and thighs are to be tied by the instrument which is to be held firmly by the assistants. Vāgbhaṭa³ uses cloth instead of leather.

Yantra-śāṭaka is also to be used during the operation of phlebotomy. Suśruta says⁴: "If venesection is required to be done, the patient is to be seated on a stool, an aratni high (from the elbow to the end of the little finger), facing towards the sun. The thighs are to be flexed, the two elbows to be placed over the knees, and the hands (the fingers being clenched into fists) to be fixed on the two sides of the neck. The two ends of the shackle which pass over the fists, are held up at his back by the left hand of an assistant, who with his right hand steadily (neither forcibly nor loosely) presses above the part selected, to make the veins prominent, and at the same time rubs on the back to

¹ सदुचितजानुकर्पुसनितरेष्य यहाववद् शूलेष शाटकैव्या।

Suśruta Saṃhitā, IV. vii.

² वक्षकम्बलकोपविद् यनशाटकैन परिचित गौवामकचपरिकर्मिभिः सुपरिषट्होत्सवन्दनयौरं कृत्वा।

Ibid, IV. vi.

³ अथ यन्त्रेष वासुसा।

सकथी विरोधरात्राव परिचित शजुक्षितम् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, IV. viii.

⁴ तत्र अथसिरे पुरुषे प्रवादिवसुखमरविभासोऽित्ते उपवेष्यासुगे सुख्यौराकुचितयो-
निवेष्ट कुपरसभित्वसोपरि हत्तावनग्नैः हातैः डक्कत्तुडो मन्ययोः खातपविला यनशाटकं
गौवामुखोऽपरि परिचित्यात्येन पुरुषेण पदात्मितेन वानहसेनोत्तानेन शाटकानारंयं शाहविला
ततो वैयो वृद्धाहविलाहत्तेन विरोधावकाशे नाशावतिगिरितं वक्षमावैष्टवेष्टक्षक्षाववादे
यत्वं पृहनये च पीडवेति कर्म्मुदवव वानुपूर्णसुव यापवेदेव उत्तमाङ्गतानामन्तर्मुख-
वर्जनानां सिराद्य च देव यन्त्राविषः।

Suśruta Saṃhitā, III. viii.

stimulate bleeding, the patient being then told to inflate his mouth with air forcibly. This is the method of binding for puncturing the veins of the head except those (veins) which have their mouths turned inside the body". Vāgbhaṭa describes a similar procedure in bleeding from the vessels of the neck¹.

The Greeks also used ligatures to tie up the arms and legs of a patient in the lithotomy position. Paul² says: "In operating, the woman should be placed on a seat in a supine posture, having her legs drawn up to the belly, and her thighs separated from one another. Let the arms likewise be brought down to her legs and secured by proper ligatures about the neck".

In modern times, similarly, we use lithotomy straps or crutch, after placing the patient in the lithotomy position during the operation of lithotomy and excision of piles.

PĀŚA.

This is a different shackle to be used for binding insane persons.³

¹ अप्तिपातपद्धिर्वो जानुशासन संस्थितः ।

मटुपडात्केशानो जानुशापित कूर्परः ॥

हुष्टिभ्यो बख गर्भभ्यो भवे शाढ़ निषीडयेत् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvii.

² Paul, VI. lxxiii.

³ भ्रौमाकारेनरेनागेदानोन्नालैय निर्जिपेः ॥

भीषयेत् सततं पात्रः कशमिच्चाय ताहयेत् ।

शक्तिविला मुपुर्वं का चासयेत् उच्चाधिना ।

Saṃketa Saṃhitā, VI. lxxii.

ABDOMINAL BINDER.

The use of cloth binder has been described before¹. Leather binder is to be used after the operation of paracentesis abdominis to apply pressure over the abdomen. After draining the fluid of ascites, the abdomen of the patient should be well wrapped with blankets, or silk cloth, or leather binder, for then the abdomen would not be flatulently distended by air.²

LEATHER BAGS.

The use of leather in the formation of bags of the *vastiyantra* has been described before³.

SIRO-VASTI. LEATHER BAG FOR THE HEAD.

For application of oil on the head, Suśruta⁴ directs us to use a goat's bladder filled with medicated oil, just in the same way as ice bags are used nowadays.

Sāringadhara⁵ describes another variety of siro-vasti : "It is

¹ See P. 181.

² निःखुतेच दोषे गाढतरमाविक काशेय चम्पशामस्त्रात्मेन परिवेष्टयेद्दरं तथा नाशापदति रक्तः ॥

³ See P. 129-30.

Suśruta Samhitā, IV. xiv.

* सज्जासीनस्य वस्त्रीयाद् वसिकोंयं ततो हृदः ।

Dīd, VI. xviii.

* विरोधक्तिविधियाच प्रोच्छते मुद्रसम्बद्धतः ।
विरोधक्तिवर्ग्याचः सादिसुखो राद्यग्रहूलः ॥
विरोधक्तिवर्ग्याच वडा भक्तै भावदिष्टकैः ॥
सन्धिरोधन्विधायादी खेहैः कोष्ठैः प्रपूरयेत् ॥
तावत् धर्येत्तु यावत् स्वाद्वासानेचसुखसुतिः ।
विदनोपश्चभो वापि मावाणां या सहस्रकम् ॥

Sāringadhara Saṃgraha, III. xi.

made of leather, has a length of twelve aṅguli and has two orifices or mouths. The leather bag is to be well tied round the head, the junction of the circumference of the bag and the skin should be well pasted with māṣa (Phaseolus Rox) glue. Then the cavity thus formed is to be filled with hot oily medicine. This is to be retained until the headache is relieved." Cakradatta¹ also mentions it. The bag is described to be sixteen aṅguli high in the Yogaratnākara². Vāgbhaṭa³ advises us to use leather of a cow or buffalo, and it is said to have been twelve aṅguli broad.

LEATHER BAND.

In phlebotomy, a band is advised to be applied above the spot where the vein is to be punctured. This band is recommended to be made of cloth, or jute, or leather, or barks of

¹ आग्निरो वापितं चर्ष्णं कृत्वा द्रुलम्भितम् ॥

तेनवेत्त्वं गिरोऽधस्तान्मायकलकेन सिपयेत् ।

निवलस्थीपविद्यम् तेलेचर्ष्णः प्रपूरयेत् ॥

Cakradatta, Śiro-roga Cikitsā,

² आग्निरो वापितशर्ष्णं बोक्षाद्रुलम्भितम् ॥

तेनवेत्त्वं गिरोऽधस्तान्मायकलकेन सिपयेत् ॥

Yogaratnākara, P. 402.

³ विविक्षय निष्कल्पं पौटे जानुसमे छद्मै ।

प्रदात्तसिद्धदेहस दिनान्ते गव्यमाहिषम् ॥

इदं शाद्रुलविक्षीयं चर्ष्णेपहृ गिरं समम् ।

चाकर्षं वन्मनं स्थानं ललाटे वक्त्रं वेदिते ।

नैतवेचिकया वहा मावकलेन सिपयेत् ॥

ततो यदाव्यापि ग्रन्ते चेहं कोषं निपिचयेत् ।

ज्ञाहं केशमूको नावद्रुलं धारयेत् तम् ॥

trees, or tendrils of twining plants¹; and it should not be applied either too tight or too loose. As for example, in phlebotomy in the foot, the yantra-sāṅkha or ligature should be applied below the knee-joint, while the band is to be tied round, at a distance of four aṅguli above the part selected for the operation.² Vāgbhaṭa³ says: "In phlebotomy, a band is to be tied round the upper extremity, four aṅguli above the spot selected for opening the vein which is to be made prominent by pressing it upwards with the closed fist." Cakradatta⁴ also quotes it. Vāgbhaṭa⁵ recommends us to use a cloth band to be tied round the leg, four aṅguli above the spot selected for opening the vein in the leg.

This band corresponds to the band of Antyllus used by the Greeks. Antyllus applies a ligature of two fingers'

¹ गावं बहोपरि ढडे रक्ता पदे न वा समम् ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

वस्त्रपटुचार्द्धांश्चलत्वानामन्यतमेन यन्त्रित्वा नातिगादं नातिकिञ्चिलं शरीरं प्रदेशमासाय दद्योक्तं शब्दं भृत्यौला सिरो विष्णेत् ॥

Sufruta Saṃhitā, III. viii.

² तत्र पादव्याप्तिरक्षय पादे समेष्टाने मुख्यरं स्थापयिताने पादगोपतस्तुचित्तमुद्देश्यं कल्पा व्यव्यापादं जानुसन्धेरथः शटकेनावेष्य इक्षाद्यां प्रपीडा गुल्फः अभ्यपददक्षीपरि चतुरङ्गलम् झीतदीनामन्यतमेन वहा पादसिरो विष्णेत् ॥

Ibid.

³ विष्णेकलागिरो वाहावनाकुचित तृप्ते ।

वहा मुखोपविट्ठ्य मुटिमङ्गुड गम्भीरो ।

त्वं विष्णेपदेशाश्र चटिको चतुरङ्गे ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvii.

* Cakradatta, Śira-vyādhādhikāra.

⁴ पादे तु मुख्यतेऽधकाचानु समेनि पोटिते ।

गाहं कराभ्यामागुलकं चरणे तस्म चोपरि ॥

रितौष्ये कुचिते किञ्चिदाद्ये इक्षवक्षतः ।

वहा विष्णेर् सिरामित्यमनुज्ञेष्यपि कल्पयेत् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvii.

breadth round the arm in bleeding at the elbow, while to bleed at the ankle, the band is to be applied at the knee. It is mentioned as fillet in the pseudo-Hippocratic treatise on Ulcers;¹ and Oribasius² gives an interesting dissertation on the subject, principally condensed from the works of Herodotus, Antyllus and Galen. Paul³ also ties a narrow band round some muscular part of the arm before abstracting blood from the inner part of the elbow. "Wherefore we must tie a narrow band around some muscular part of the arm, and having by friction of the hands upon one another produced the necessary fulness of the vein, we divide it transversely, but only along its breadth."

LEATHER BOTTLES, JAES, MASAKA, etc.

Leather was used in the manufacture of bottles and jars. Leather masaka for honey, Soma juice, and dadhi (curdled milk), is mentioned in the Rgveda⁴ and also in the Laws of Manu where

¹ Ulcers, iii. 328.

² Med. Collect., vii, Phlebotomy.

³ Paulus Aegineta. Adam's Trans. Bk. VI. Sec. XL.

* हतेरिव तेऽऽकमण्टु सर्वां ।

अचिह्नस्य दधन्वतः सुपूर्वस्य दधन्वतः ॥

Rgveda, 6 M. 48 S. 4 A. 8 Ch. 18 v.

यो ह वा अथुनो हतिराहितो रथवदेष्ये ।

ततः पिषतनविना ॥

Ibid, 8 M. 5 S. 5 A. 8 Ch. 19 v.

उच्छिदं चम्बीभरं सोमं पवित्रं का सज ।

नि पेहि गोरवि लवि ॥

Ibid, 1 M. 28 S. 1 A. 2 Ch. 9 v.

एष सोमो अचि लवि नवा कौडवद्विभिः ।

इन्द्रं मदाय जीहवत् ॥

Ibid, 9 M. 66 S. 7 A. 2 Ch. 20 v.

it is called *dṛti*¹. Leather maṣaka or inflated skins were in use as swimming bladders, and we have a representation of "figures with garlands in their hands, swimming and disporting themselves, supported on maṣaks or inflated skins."² In the Rgveda, Agastya in his spell to neutralise poison, says:³ "I deposit the poison in the solar orb, like a leather bottle in the house of a vendor of spirits."⁴ Dr. Mitra points out that "other smṛtis ordain that oleaginous articles preserved in leather bottles do not become impure by the contact of the impure cowhide; and in the present day, jars of that material are in extensive use in Bengal and the North-West Provinces for the storage of oil and ghee. In the latter place, leather bags are universally used for raising water from wells, and

स्वति भीमो दृपभस्त्रविषवा घटे विशानो हरिष्ठो विचक्षणः ।

था योनि सोमः सुकृतं नि वीदति मन्ययो लग्नभवति निषिंगव्ययोः ॥

Rgveda, 9 M. 70 S. 7 A. 2 Ch. 7 v.

एष स्य भानुष्टदिवति⁵ युज्वते रथः परिज्ञा दिवो अस्य सानवि ।

पृचासो अचिन्मिधुना अधि चयो हृतिकुरीयो मधुनो वि रप्तते ॥

Ibid, 4 M. 45 S. 3 A. 7 Ch. 1 v.

See Wilson's Rgveda, II. 25.

¹ इन्द्रियाचा तु सर्वपां यथेकं चरतीन्द्रियम् ।

ततोऽस्य चरति प्रश्ना हनेः पादादिवोदकम् ॥

Manu Smṛtī, II. 99.

"But when one among all his organs fails, by that single failure his knowledge of God passes away, as water flows through one hole in a leathern bottle."

Ibid, Jones' Translation.

* PL xxxi. fig. 1. Fergusson's Tree and Serpent Worship, P. 127.

* स्वं विषमा सजानि हृतिं मुरावयो घटे ।

Rgveda, 1 M. 191 S. 2 A. 5 Ch. 10 v.

* Ibid. Wilson's Translation.

according to the law books of Śāṅkha and Likhita,¹ that water is declared pure which is kept in old leather bottles”². To this may be contrasted the prevailing Hindu notion that water is defiled if touched by a Brāhmaṇa in his shoes. Though the leather is not allowed to be a material of dress of the Hindus, except his shoes which are considered as unclean, leather belts formed one of the eight sacred utensils necessary for a śramaṇa of the Buddhist order; and in the Manu Saṁhitā³ we find the students of theology advised to “wear for their mantles, the hides of black antelopes, of common deer, or of goats.”⁴

5. ANTARVALKALA. THE INNER BARKS OF TREES.

Barks of trees are recommended to be used as splints for the support of fractured bones. In fractures of bones of the foot, leg and thigh, Suśruta directs us to use splints made of barks of trees⁵ to surround the limbs. In the treatment of a simple fracture, Bhāva Miśra advises us to use cold water first, then mud is to be applied, and lastly the fractured bones should be secured

¹ आपो हृषवदग्न्यवलः परिषुर और्बंचन्दकरसङ्केवन्धुताः ।

चन्दकरसः चर्चपुटः ।

Śāṅkha and Likhita.

² Dr. R. C. Mitra's Indo-Aryana, vol. II.

³ कार्णीरीववासानि चमांचि व्रश्चारिष्यः ।

वसीरवानुपूर्वेण शाश्वतीमाविकानि च ॥

Manu Saṁhitā, II. 41.

⁴ Ibid. Sir Wm. Jones' Translation. II. 41.

⁵ अवज्ञ संपिण्यापादं तत्तमयं कुण्डोत्तरे ।

वस्त्रपृष्ठे वक्षीयाद्रच व्यायाममाचरेत् ॥

Suśruta Saṁhitā, IV. iii.

by splints and bandages.¹ In the *Yogaratnākara*², we are advised to treat fractures, by lowering the raised end and elevating the depressed end of the bone, and then by using splints and bandages to keep them in position. Bhāva Miśra³ describes it similarly after Suśruta. Suśruta directs us to use barks of Vata (Ficus Indica Rox.) and bamboo strips as splints to support the neck after reducing its dislocation by holding at the temporo-maxillary articulations on the sides and the occipital protuberance on the back, and raising him up in the air. He should lie down with his head raised for seven days⁴. In modern times, the Sayre's suspension apparatus and jury mast serve the same purpose.

The barks of Madhuka (*Bassia latifolia*), Aśvattha (*Ficus religiosus*), Kukubha (*Terminalia arjuna*); Polāśa (*Butea frondosa*, Rox.); Udumbaru (*Ficus glomerata*, Rox.); bamboo; sāla (*Shorea robusta*), Vata (*Ficus Indica*, Rox.) are mentioned as

¹ चाटी भयं पिदिला तु सिचयेच्छीतलाम्बुना ।

पद्मालिपनहायैं वन्धनक कुशानितम् ॥

Bhāva Prakāśa, II. iii. Bhagnādhikāra.

² पद्मालिपने कुर्याहननं च कुशानितम् ।

अवनामितसुद्राम्बोद्भवते चावपीडयेत् ॥

विसः हिषापि च स्थाने संस्थाप्य विधिमाचरेत् ॥

Yogaratnākara, P. 345.

³ अवनामितसुद्राम्बोद्भवतावपीडयेत् ।

आम्बेदतिवित्तमधीवतचोपरि वर्तयेत् ॥

Suśruti Saṃhitā, IV. iii.

Bhāva Prakāśa, II. iii. Bhagnādhikāra.

⁴ अवटावयहन्तोषं प्रदल्लोभमयैङ्गरैः ।

तथा कुशान् समंदत्ता वस्त्रपट्टे न वैदयेत् ।

उत्तानं शाश्वयेद्देनं सत्तरावभत्तिंत्सः ॥

Suśruti Saṃhitā, IV. iii.

supplying the materials of splints¹. Bhāva Miśra² adds Kadamba (*Anthocephalus cadamba*), Hijjala (*Barringtonia acutangula*), Sarjja (*Pinus longifolia*) to the list. Such splints are called kuśa, and Vāgbhaṭa³ says that the splints should be broad, thin, pliant and clean.

Dr. Jacobi, of Dublin, says that he has seen an excellent splint made from the "fresh bark of a tree, taken off while the sap is rising". "It fits admirably", says he, "just like paste-board soaked in water"⁴. Dr. C. C. Jewet⁵ recommends for the same purpose the bark of *leriodendron*, or tulip tree.

THE CRUTCHES.

The crutches were used to help the crippled. In the Vajasanīya Saṁhitā of the White Yāyurveda, there is a passage describing the different kinds of human victims, appropriated to particular gods and goddesses. The passage occurs also in the Taittirīya Brāhmaṇa with slight differences. There we

¹ सधूकोदुम्बराचल्य पलाश ककुभत्वः ।
वैशसच्च वटाना वा कुशाच्च मुपसंहरेत् ॥

Saṁhita, IV. iii.

² सधूकोदुम्बराचल्य कदम्ब निचुलत्वः ।
वैशसच्च वृन्दानामाष कुशाच्च मुपसंहरेत् ॥

Bhāva Prakāśa, II. iii. Bhagnādhikāra.

³ कदम्बोदुम्बराचलसज्जाच्चेन पलाशेऽः ।
वैशोइव वा पूरुभि सतुभिः सुनिवेशिते ॥
सुद्रव्यः सुप्रतिकार्ये वैत्कलैः शक्लैरपि ।
कुशाहयैः समं वन्धं पाङ्गोपापरि वोल्लवेत् ॥

Aṣṭādau Hydaya Saṁhitā, VI. xxvii.

¹ Hamilton's Fractures and Dislocations. 5th Ed. P. 50-51.

² The 20th Mass. vols.

find "to the two (deities) who preside over the gains above or below one's expectation (utkula and vikula), a cripple, who can not move even with the help of a crutch" is recommended to be sacrificed. And again "to the divinity of land, a cripple who moves about on a crutch."¹

The use of the sound limb as a splint of support for the fractured bone of the opposite side was well known. Wooden splints resembling in shape the injured member are also recommended. Suśruta says² that if the hand be fractured, it is to be tied with the opposite hand, but in fractures of both the hands, Gayadāssa³ recommends a wooden hand to be used as a splint for both. After union of the fractured bones, the hands should be made to hold balls of cow-dung, mud and stones.

6. LATĀ OR CREEPERS (TENDRILS OF).

The tendrils of creepers as materials of ligature are mentioned

¹ उल्कुलविकुलाभ्या (उल्कुलविकुलिभ्यः) लिङ्गिनैः ।
भूये पौष्टसर्पिनमालभैति ।

Taittirīya Brāhmaṇa.

Quoted in Mitra's Indo-Aryans, vol. II, P. 84—85.

² उर्म तथे सुमे कृत्वा तत्त्वमग्रस्य देहिनः ।
वज्रीवादामतैलेन परिषिकच कारयेत् ।
प्रात् गोमयमयं पिण्डं धारयेन् सखायं ततः ।
हस्ते जातवक्षीचापि कुण्ठान् पाणे ॥

Suśruta Saṃhitā, IV, iii.

³ गवीतु उर्मपि हस्तत्वे तदेकस्य भड्डे वासे दिच्छिन दिच्छिन वासिन, उर्मयोन्मुमहो न
तत्त्वमेन, काहमयेन कृत्वा इ अपि वज्रीवादेवं दाश्यः भवतैति, सत्पिण्डादिधारयसाम्बक्षं
प्राप्तार्थम् ।

Quoted in Dallana's Commentary, IV, iii.

by Suśruta. He recommends¹ to give up a patient, bit by a snake, as hopeless when he does not respond to the application of stimuli, such as cold water, tendrils of creepers, etc. Vāgbhaṭa² advises us to introduce the stalk of the lotus, with a thread tied to it, inside the throat to extract any foreign body stuck there. When the soft stalk is touched by the sālyā, it should be extracted by the sudden withdrawal of the stalk and thread.

7. VASTRA OR CLOTH.

Cloth³ as a material of bandages, tents, gauze, etc. has been described before⁴.

8. AŚTHIĀŚMA. STONE OR PEBBLE.

It is a piece of stone—long and round. It is advised to be used for moving arrows fixed in the bone⁵. Caraka⁶ advises us to strike two pieces of stone against each other to resuscitate a

१ अत्रीवं पितातप पौडितेषु वालप्रमेहेभ्य दर्शनीयु ।
इहातुर चोष्टुभूचितेषु रुदेषु भीकथ्य दुर्द्विनेषु ॥
शक्तवने यस्ता न रक्तमनि राज्योलतामित्य न सम्बवनि ।
शोताभिरादिय न रोम हर्षो विद्याभिमूर्ते परिवर्ज्जवेत् ॥

Suśruta Saṁhitā, V. iii.

३ करुचोतीगते शत्य मृत्व कर्त्ते प्रवैश्येत् ।
विसेनात्ते ततः शत्य विसं मृत्व समं इरेत् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

४ वस्त्रं प्रसिद्धं तूलकं मूर्वनिर्दितं वैटनार्थं प्रयुज्यते ॥

Vāgbhaṭārtha Kaumudi, I. xxv.

¹ See P. 176-83.

² अग्रप्रसारस्तुङ्गं शक्तपौडिनायं निर्धातनाच युज्यते ॥

Ibid.

³ अग्रमनोः संघटनं कर्ण्यामुले शोतोदकेनोचोदकेन वा मुख्यपरिषेकः ।

Caraka Saṁhitā, IV. viii.

still-born child. In bleeding from the veins of the neck, Vāgbhaṭa¹ advises the patient to hold firmly two pieces of stones in their hands.

A piece of stone is to be used by a person, for holding it with his hand, after recovery from fractures of the carpal and metatarsal bones².

In ancient times, in India, the kings used to decorate themselves with antidotal gems, as a safeguard against poisons.³ Even now the snake charmers apply a black stone on their bodies where they are wounded by the venomous reptile. This stone is popularly known as the vi-a-pāthara or poison-stone, and is supposed to have the property of extracting poison from the body.

9. MUDGARA. HAMMER.

Suśruta directs us to use a hammer or a piece of stone to strike an arrow firmly fixed in the bone, until loosened, when it can be conveniently extracted by means of a pair of forceps⁴. It should be pointed out that the tubular instrument—salya

¹ पायाक्षयमहस्ता जानुप्रे प्रसन्ने भूते ।

कुचेराम्ब सदिते विधेहोर्द्विपृक्ते ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvii.

* See foot-note. 2. P. 196.

² विधेहेक्षदके सातो विधेहस्थितिः ।

परौचितं सुनदीयामाङ्गुखाविधिष्वत् ॥

Kāmāndakiya Nītiśāra, Ch. vii. v. 16.

रचितो नडुरोद्वार नलियस्य विमूष्यते ।

स्वावरे जड़मे तस्य विधे निर्जिवितो भ्रजेत् ॥

³ अस्तिद्वौसुचित मठीलामसुद्वाराशामन्ततमस्य प्रहारेण विचाल्य यदामांभेदः ।

Suśrata Saṃhitā, I. xxvii.

nirghātāni—described before¹, served the same purpose. Vāgbhaṭa also uses a hammer² to shake an arrow fixed in the bone, and directs us to extract it with the hands or by the various kinds of forceps³.

The Greeks used some iron instrument to shake such an arrow from the place where it was lodged. The hammer was also used by the Greeks and Romans but in a different capacity. Paul mentions its use in cranial surgery to strike the lenticular and gouge⁴. Paul and Celsus describe a "method of extracting foreign bodies from the ear by laying the patient on a board and striking the under side with a mallet."⁵ Vāgbhaṭa describes this method for draining out water from the ear.⁶

10. PĀNIPĀDATĀLA. THE PALM OF HAND AND SOLE OF FOOT.

11. AṄGULI OR FINGERS.

The surgeon's hand is considered by Suśrutā to be the principal instrument as the use of all other instruments depends

¹ See P. 111.

² सुङ्ग्राहाइतया नादा निर्वालोचुचितं हरेत् ।

हरेव चानयेन्द्रांगमार्गस्युचितं तु यत् ॥

Aṣṭāṅga Hṛdaya Samhitā, I. xxviii.

³ अभाहरेत् करप्राप्य चक्षुवेतरत् पुनः ।

हयम् सिंहाहिमकरमिः कर्कटकासमैः ॥

चहस्त्र ब्रह्मसंस्थानाद यडीतुं भवते यतः ।

कद महात्र कुरर यरामी वायसाननेः ॥

Ibid.

⁴ Paulus Aegineta VII. xc.

⁵ Milne, Graeco-Roman Surgical Instruments, p. 125.

⁶ कर्णानु पूर्वे हस्तेन मधिला तेजवारिचौ ।

विपेदधीसुखे कर्णे हस्तादा चुपयेत् वाऽन् ॥

Aṣṭāṅga Hṛdaya Samhitā, I. xxviii.

upon it¹. But again he mentions the hand and foot as accessory to, or substitutes for, the instruments. Longmore² says: "Of all instruments for making a complete examination of a gun-shot wound as well as for exploring for foreign bodies which may be lodged in it, the finger of the surgeon is the most appropriate, whenever a wound is large enough to admit of its insertion." There are many instances of the use of hand and foot in the treatment of surgical diseases but I shall point out a few of them.

1. Both Suśruta³ and Cakradatta⁴ say that "if a swelling be hard but slightly painful, then it should be well fomented, pressed and rubbed by a piece of bamboo, or palm of the hand, or thumb to cause its subsidence. Bhāva Miśra also quotes this verse⁵. Suśruta⁶ and Vāgbhaṭa⁷ recommend a similar treatment for enlarged glands.

¹ See foot note, P. 90.

² Longmore, Gun-shot Injuries, 1877, P. 319.

³ अभ्यज्य स्वेदयित्वा तु वैश्वाना वा शनैः शनैः ।

विमद्द्येहिषक् प्राचमन्तलिनाङ्गुष्ठकेन वा ॥

Suśruta Saṃhitā, IV. i.

⁴ अभ्यज्य स्वेदयित्वा च वैश्वानादाततः शनैः शनैः ।

विस्तापनार्थं सङ्कीर्णात् सलेनाङ्गुष्ठकेन वा ॥

Cakradatta, Vṛṇḍalotha Cikītśā.

⁵ अभ्यज्य स्वेदयित्वात् वैश्वानादा शनैः शनैः ।

विमद्द्येहिषक् मन्तलिनाङ्गुष्ठकेन वा ॥

Bhāva Prakāśa, II. iii.

⁶ हतेषु दोषेषु वथानुपूर्वं यस्ती भिषक् श्वे य समुचितेत् ।

सिद्रस्थ विस्तापनमेव कृष्णाङ्गुष्ठकोषोपलब्धेऽट्टकोः ॥

Suśruta Saṃhitā, IV. xviii.

⁷ संस्थेष्य वह्नीयस्थि विमद्द्येयात् पुनः पुनः ।

Aṣṭāṅga Hṛdaya Saṃhitā, VI. xxx.

2. Suśruta says¹ that "when a morsel of food sticks in the throat, a blow should be fearlessly struck with the fist on the shoulder of the patient without his knowledge": Vāgbhaṭa² also describes it.

It is however curious to find that exactly the same procedure was adopted by Alsaḥaravīus. Adams in his commentary³ on Paul says that "when a morsel of food sticks to the cesophagus, Alsaḥaravīus directs that the person should be struck on the back, which will facilitate the descent of it".

3. In the reduction of dislocation of the lower jaw, Caraka used his fingers to do it exactly in the same way as recommended by the modern surgeons. He directs us to depress the lower jaw by the thumbs and at the same time to raise the chin by the index fingers⁴. The verses are quoted by Cakradatta.⁵ The description of the method, quoted from any modern text book, would be a good commentary on the above passage of Caraka. Erichsen says⁶: "The reduction is best effected, by the surgeon,

¹ यासुग्रस्येत् कल्पासप्तो निःशब्दमनुदृहक्षम्ये मुटिनाभिहवात् चेदं मर्दं पानीयम् वा पाययेत् ।

Suśrata Saṃhitā, I. xxvii.

² अथान स्त्रभ्यवाताभ्यां यासग्रस्ये प्रविश्येत् ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxviii.

³ Adam's Commentary on Paulus Aegineta, VI. xxxii.

* व्याकानने हनुं स्त्रिनमङ्गाधाम्यां प्रपीड्य च ।
प्रदेविनीभ्यास्त्रीत्र्य चित्तुकोद्धमनं हिते ॥
सक्तां सङ्कमयेत् स्त्राने सक्तो स्त्रिं विनामयेत् ।
प्रत्येकं स्त्रानदूष्यादिकिया देशेषमावरेत् ॥

Caraka Saṃhitā, VI. xxviii.

⁴ Cakradatta, Vātavyādhī Cikitsā.

⁵ Surgery, Vol. II, p. 658.

standing before the patient, placing his thumbs, well protected by napkins, or a few turns of a narrow bandage, on the molar teeth on each side, and then depressing the angles of the jaw forcibly, at the same time that he raises the chin by means of his fingers spread out and placed underneath it."

4. Caraka says¹ : "After pairing her nails and covering the tip of her index finger with cotton, the nurse is to clean the palate, lips and throat of the new-born child".

With this passage we may compare what Barnes says on the point². "The attendant having then placed the child close to the mother, so as to avoid any strain on the cord, should cleanse its mouth from any fluids, such as blood and mucus, it may have partially swallowed during its passage through the vagina. This should be done at once, as such fluids drawn into the lung vesicles may give rise to inflammation of the lungs, or even septicaemia."

5. Suśruta³ recognises "six modes of diagnosing diseases, namely by the five senses *i.e.* by hearing, smell, taste, sight and touch, and by questions. "Symptoms discernible by the sense of touch are coolness or heat, smoothness or roughness, softness or hardness, and other tangible qualities of the skin in fever, dropsy,

¹ अदाय ताल्लोडकस्तु निहापमार्चनमारभेत अङ्गव्यासुपरित्वितनख्या सुप्रचाजितो-पधानकार्यांसपिचुमत्या। प्रथमे प्रमाणितसाम्य च शिरकालु कापांसपिचुना सेहगमेन प्रतिक्षादयेत्।

Caraka Saṁhitā, IV. viii.

* Obstetric Medicine and Surgery, Vol. II, p. 105.

* धिदी हि रोगाणा विज्ञानोपायः। तदया प्रश्नमि शोवादिभिः प्रश्नेन चेति।

* * * स्पर्शमेन्द्रियविशेषाः शौष्ठीचान्द्रकार कर्कशस्त्रकठिनत दद्यो ज्वरशोफादिषु।

Suśruti Saṁhitā, I. x.

and other diseases." And we know how important it is to educate the tactile sense in the diagnosis of diseases.

6. The foot is recommended to fix a part of the human body whence any foreign body may be removed easily by the hands.¹ Suśruta says²: "If a foreign body cannot be easily extracted, as when it is impacted in the hollow or the substance of a bone, the part should be pressed by the feet, and it should be drawn out by the instrument." Vāgbhaṭa also gives a similar description³. Caraka describes a method of removal of the placenta if not spontaneously separated. One of the female attendants should press upon the navel of the peurpera forcibly with her right hand, while with the left hand placed upon her back, she should shake her. Then the heel is to be placed on the patient's buttock while the two sides of the gluteal regions are also to be pressed and shaken⁴.

12. JIHVĀ OR TONGUE.

The organ of taste as a means of diagnosis is noted by

¹ पाद इति पादेन शरीरदेशं भूत्वा इसादियन्ते च उहरणादि क्रियते ।
Vāgbhaṭārtha Kaumudi, I. xxv.

² अस्थिविवरप्रविष्टं अस्थिविद्दं वाऽवस्था पादभ्यां यन्ते शापहरेत् ।
Suśruta Saṁhitā, I. xxvii.

³ अस्थिहर्ते नरे पदभ्यां पौड़विला विनिहरेत् ।
इत्यशको मुचलिभिः सुषट्हीतस्य क्रिहरेत् ॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

⁴ तस्याचेदमरा न प्रयत्ना स्थादेनामन्ततमा स्त्री दक्षिणेन पालिना नामेऽपरिहारलवत्
निधीया सब्देन पालिना पृष्ठत उपसंस्था सुनिहर्ते निर्व्वत्यात् । अवास्ता! पादपार्श्व-
शोथोमाकोटीयेदस्याः स्फिक्षाहुपसंस्था सूपीकिं पौड़वेत् ।

Caraka Saṁhitā, V. vii.

Suśruta¹. "Symptoms discernible by the sense of taste are the various tastes noticeable in morbid secretions of urine and other diseases". Cakrapāṇi "explains that 'inference' is necessary, because the sense of taste can not be exercised by the physician on the patient directly;"² he must do it through some intermediate agents such as ants, whose attraction to sugar is well-known and so the presence of sugar in urinary diseases can be inferred."

13. DANTA OR TOOTH.

Ivory as a material of surgical instruments has been described before³. Suśruta⁴ advises us to use the ash of ivory with stibium as a stimulant to the growth of hair on a scar. It is also recommended by Vāgbhaṭa⁵.

14. NAKHA OR NAILS.

Suśruta advises the surgeon to use his nails⁶ for the operation of cutting, piercing and extraction, if these can be possibly helped by his nails.

In modern times, nails often help the surgeons in separating

¹ रसनेन्द्रियशेषाः प्रमेहादिगु रसविशेषाः ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. x.

² Hoernle's Commentary on the Suśruta Saṃhitā, I. x. (Bibliotheca Indica).

³ See page 67.

⁴ इक्षौदलमसीं कृता सुख्यचैव रसात्मनं ।

रेमावेतेन जायते लिपात् पानितवेष्यपि ॥

Suśruta Saṃhitā, IV. i.

⁵ लेकात्ता इक्षिदलस्य नदी वा चौथर्थं परम् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, VI. xxiv.

⁶ आहार्यक्षेत्रमेदेषु नखं शक्येषु योजयेत् ।

Suśruta Saṃhitā, I. viii.

layers of tissues during operation as in the operation for the radical cure of hydrocele. We often extract thorns, impacted in our body, with our nails.

15. MUKHA OR MOUTH.

The use of mouth as a suction apparatus was well known to the ancients. Suśruta advises us to use śārū or pāṇimantha (awl) to perforate bone in diseases of the medullary canal, caused by obstructed and deranged air. He next introduces one end of a tube, open at both ends, into the canal through the perforation in the bone, while through the other end the surgeon sucks out air by his mouth¹. The use of mouth for sucking out air through the śṛṅga or horn has been described before². Caraka says³ that the poison of a snake-bite may be sucked out by the surgeon's mouth, filled with flour or ash. Even in modern times, it is common amongst Indians to suck out blood, in accidental cuts by knives, by the mouth. The practice of the suckers in Europe has been noted before⁴.

16. VĀLA OR HAIR.

Horse-hair is to be used for applying ligatures round the piles⁵. It is also a material of suture for the skin. Horse-hair is also described to have been used for raising pterygium. Paul⁶ also used horse-hair to raise a pterygium.

¹ निकहे श्वनि वा वायी पातिमनेन दारिते ।
नाडौं दस्तुव्यनि भिषक् चूषयेत् पवनं वलौ ॥

Suśruta Saṃhitā, IV. iv.

² See P. 148-49.

³ दंडे वा चूपेमूखेन धरचुर्चं पात्सुपूर्वेन ।

Caraka Saṃhitā, VI. xxv.

⁴ See P. 149-50.

⁵ वाला, अचादीनां पृथक्भवतेजा तुकेशाय अर्जो वात्यादि वस्त्राद्यं तुज्यते ।

Vāgbhaṭaṛtha Kaumudi, I. xxxv.

⁶ Paulus Aegineta, VI. xviii.

Suśruta¹ says: "Bundles of hairs or tents are to be used in the treatment of wounds in the skull, formed by the extraction of an arrow from the brain. These would prevent the hernial protrusion of the cerebral substances from passing out through the wound. The hairs are to be removed one by one, as the wound heals up gradually." Vāgbhaṭa² also approves this treatment.

A bundle of hairs tied to a long thread is mentioned by Suśruta to have been used for the extraction of fish-bones from the throat³. The patient is directed to swallow the ball of hairs with some liquid. Next emetics are to be administered to excite vomiting. During this act, the foreign body gets entangled in the meshes of the ball, which being then suddenly pulled out by the thread outside, extracts the fish-bone satisfactorily. Vāgbhaṭa⁴ also describes it similarly. For this purpose

¹ शिरसोपहते शल्ये वालवर्णि प्रवेशयेत् ।

वालवर्णीमदतया नम्भानुङ्गं व्रचात् कर्वेत् ॥

Suśruta Saṃhitā, IV. ii.

² काथां शल्याहते विहे भक्षाचिदलिते किया ।

शिरसोपहते शल्ये वालवर्णि प्रवेशयेत् ॥

मन्भानुङ्गसुते कुही इवादैनं चलीज्यथा ।

वर्णे रोकति चैकैकं शनैरपनयेत् कचम् ।

मन्भानुङ्गसुतौः स्वादेन्द्रियिकानन्दजीवजान् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, VI. xxvi.

³ अस्तिशयस्त्रव्यथा लियक्ककस्त्रासत्तमर्चया किमोस्युकं हडे क मृतवह्नि द्रवभक्तोपहितं प्रविदाकस्त्राव पूर्वकोऽपि वामयोदयतय शल्ये कदेशसत्ता आला सुवै सहस्रा त्वाचिपेत् ।

Suśruta Saṃhitā, I. xxvii.

⁴ कोशोन्दुकिन पौत्रेन इवैः कन्टकमाचिपेत् ।

सहस्रा मृतवहेन वसति ज्ञेन चित्तरत् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxviii.

a tooth brush formed by chewing the end of a narrow branch of a tree is also recommended¹. A common domestic remedy is to make the patients swallow large morsels of boiled rice, plantain, etc.

Paul² mentions a similar contrivance, and says: "Some are of opinion that the patient ought to be made to swallow large morsels, such as stalk of lettuces or pieces of bread; but others direct us to bind a thread about a small piece of clean soft sponge and give it to the patient to swallow, and then taking hold of the thread to draw it up, and to do this frequently in order that the thorn may get fixed in the sponge and be brought up". For this purpose Aetius used the epilation forceps. Paul calls it acanthobolus or the fish-bone forceps.

The modern surgeons use a probang for the same object. "Small sharp bodies, such as bristles, fish-bones, or pins, are generally found sticking between the pillars of the fauces and the tonsils." Such bodies "should not be pushed on, but an endeavour should be made to catch them with the "horse-hair probang." This being pushed gently, unexpanded, beyond the point where the pin or bone is stuck, is expanded by pulling up the handle and then withdrawn with a slight rotatory motion."³

Caraka⁴ mentions the practice amongst the recently delivered

¹ मदुना वा दनधावनकुञ्जकेनापहरेत् ।

Suśruta Saṁhitā, I. xxvii.

² Paulus Aegineta, VI. xxxi.

³ Swain's Surgical Emergencies, 3rd ed., Pp. 32-33.

⁴ अथासा वालवेष्या कष्टतालं परिवेश्य ।

Caraka Saṁhitā, IV. xviii.

women to push a braid of her hair into her throat, to help the expulsion of the placenta. So in the *Yogaratnākara*¹, her throat is advised to be rubbed by a finger surrounded by hairs. This practice is still prevalent among the women of Bengal to a certain extent.

SUTURE MATERIAL.

Horse-hair was the material used by the Hindus for sutures. Besides it, they used² sutures of fine thread, or the fibres of the bark of *Aśmantaka* (*Cesalpina digynia*), or threads made of hemp or flax, or of the fibres of which bow-strings were made, or of the fibres of the *Mūrvvā* (*Sansevieria zeylanica*) or *Guḍūcī* (*Tinspora cordifolia*). Besides these, the Hindu surgeons used the mouth parts of the ants as clasps to close incisions on the intestines. *Suśruta*³ describes the use of living black ants to close the incisions on the walls of the intestines, during the operation for intestinal obstruction, after removing the scyballi, stones, etc. He advises us to remove the bodies of the ants, leaving their heads fixed on the margins of the incision,

¹ किंवर्द्धित्याकुला तथा: कस्तु प्रयत्नयेत् ।

Yogaratnākara, P. 437.

² सीबेत् सूख्योष सूतेष वस्त्रेनाप्तमनकस्त वा ।

सनजचीमसूताणां खाद्या जारिन वा पुनः ॥

मूर्खाणुचौतानेवां ।

Suśruta Samhitā, I. xxv.

खाद्या सूतेष वस्त्रेतः ।

सीबेत् दूरे नासदे गटहात्रात्यं न वा वहु ॥

Aṣṭāṅga Hṛdaya Samhitā, I. xxix.

³ परिकारिकायेवस्त्रं गत्यसुखूत्यात्मकावान् संशोध्य तच्छिद्भवत् समाधाय कृच-पिपीलिकाभिदेशयेत् इहो च तासां कायानपहरेत्र सिरांसि ततः पूर्ववत् सीबेत् ।

Suśruta Samhitā, IV. xiv.

in the act of biting. Then the intestines should be replaced with the ants' heads sticking to them. Caraka¹ also describes the use of ants for obliteration of small perforations in the intestines, but he takes away the ants before replacing the gut into the abdominal cavity. If by any accident, the abdominal muscles be incised and the intestines come out of a gaping wound, Suśruta recommends us to allow black ants to bite the exposed coils of intestines before replacing them into the abdomen². This is a curious practice of ancient surgery of the Hindus. The Greeks and Arabs never mentioned it. "Amongst some Indian tribes, it is customary to allow both edges of a wound to be seized by the sharp head-nippers of certain ants, whose bodies are then rapidly cut off; one ant after another being used, the wound is closed."³

Suśruta describes four sorts of sutures, viz:

1. Vellitaka or winding.
2. Gophaṇikā or like a sling.
3. Tunna sevanī or continued sutures.
4. Rjugranthi or interrupted sutures.

¹ विद्राग्णनस्य तु स्यूलेदेशमिला पिपीलिकैः ।
वदुशः संस्कृतानि मत्वा चिह्ना पिपीलिकान् ।
प्रतियोगैः प्रवेश्यान्ते वह्नि सीक्षेद ब्रह्मं ततः ॥

Caraka Saṃhitā, VI. xviii.

² अभिद्रमकं निष्कुर्सं प्रवेश्य नामया भवेत् ।
पिपीलिकाशिरोयकं तदाघे के वदनि तु ॥
प्रचालय प्रयत्ना दिश्य उष्मागोलित पाशाभिः ।
प्रवेश्येत् क्षत्तनखी हतेनाक्तं श्रान्तेः श्रान्तेः ॥

Suśruta Saṃhitā, IV. ii.

³ Neuburger's History of Medicine. Playfair's Translation, Vol. I., P. 9

These are advised to be so applied as they may suit the different parts of the body¹. The needles must not be introduced either too far from, or too close to the edges of the wound. In the former case, the lips of the wound shall be inflamed and so cause pain, while in the latter, the sutures will give way².

The use of horse-hair as a material for suturing wounds was unknown to the Greeks and Romans. They used sutures of flax and woollen threads for wounds. Paul says : "Afterwards we unite the separated parts with a needle containing a woollen thread, being satisfied with two sutures."³ Celsus⁴ advises us to use sutures of soft thread ; and the apolineose of Hippocrates⁵ is directed to be made of crude flax.

17. ASVAKATAKA. THE RING OF A HORSE'S BRIDLE.

Suśruta says that when the arrow is firmly fixed in the bone and if it can not be extracted by forcible pulling by hands or instruments, it should be tied to the ring of a horse's bridle. Then the animal is to be whipped, when by the sudden movement of the horse, the weapon would be jerked out of the wound⁶.

18. SĀKHĀ OR BRANCH OF A TREE.

Another method is to tie such an arrow by means of a rope

¹ सौच्येद्वितकं शनैः ।

सौच्येद्विकाणिको वापि सौच्येदा तुदुमेवनी ।

सहजुरथिमयो वापि यव्यायोगमयापि वा ॥

Suśruta Samhitā, I. xxv.

² Paulus Aegineta, VI. xii. Adam's Translations.

³ Celsus, V. xxvi.

⁴ Hippocrates, iii. 132.

⁵ अन्धवक्तके वा वर्षीयादवैनं कशया ताडियाद्योत्रमयन् शिरोविगेन शल्लमुहरति ।

Suśruta Samhitā, I. xxvii.

to the branch of a tree, lowered by pressure¹. When the pressure is released, the branch suddenly goes high up, and thereby it pulls the weapon out of the wound². Dallana, however, mentions another view that a bridle-ring and a branch of a tree are both required for the extraction of foreign bodies³. Hærnle remarks: "The branch apparently is put through the ring to afford a stronger pull"⁴. Vāgbhaṭa⁵ also mentions these contrivances.

19. STHIVANA OR SPITTLE.

Dallana⁶ understands by it—"throwing out expectoration and saliva by the mouth." By this means any foreign body lodged in the oral cavity, such as in the gums, fauces, may easily be got rid of.

¹ हृदां वा हच्चशास्त्रानवनम् तासां पूर्ववद्वद्वोहरेत् ।

Susruta Saṃhitā, I. xxvii.

² शस्त्रा, हच्चशास्त्रा, वडायास् दिनमिताशः शास्त्रायां शल्यायभानं हृदं वदा, सहसा शास्त्रान्वयेन उच्चितया शास्त्रया शल्यमुच्चिपते ।

Vāgbhaṭārtha Kaṇṇudi, I. xxv.

³ अन्ये लेखं पठति अशक्तमेव वा वज्रवद्धि मुपरिगटितस्य यन्ते दैनं याहविला शल्य-मावदं प्रविभूत्य धनुग्नं नैवद्वैकतःशायाच्चवक्कटके वधीयात् । अद्येनम् इत्यच कारकिक पाठः कशया ताङ्गेत् यथोद्गमयन् जिरोवंगेन शल्यमुद्वेरति, नमितायां पचाङ्गां हच्चशास्त्रायां व पूर्ववद वद्वोहरेदिति ॥

Nirandha Saṅgraha, I. xxvii.

* The Susruta Saṃhitā, Bibliotheca Indica, P. 48, foot note 100.

⁴ तथायशक्ये वारड़ वक्कीकृत्य धनुजंया ।

मुवहं वक्कटके वधीयात् सुसमाहितः ॥

सुसंवतस्यःपचाङ्गा आजिनः कशयवृत्तम् ।

ताङ्गेदिति मूर्ढानं वेगेनोद्गमयन् यथा ॥

उहरेच्छलमेवं वा शास्त्रायां कशयेतरोः ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxviii.

⁵ हौवणं शेषादिनिरसनम् ।

Nirandha Saṅgraha, I. vii.

20. PROVĀHANA OR FLUXING THE PATIENT.

This comprises the acts of emesis, purgation and lacrymal secretion. Thus the foreign bodies lodged in the alimentary canal or eyes may be got rid of by causing discharges from the bowels, the stomach, or the eyes¹.

21. HARŚA OR OBJECTS EXCITING HAPPINESS.

Persons suffering from vrana or wound are directed to have their minds in a state of cheerfulness by the sight of objects exciting happiness². A cheerful man is a better subject for a surgical operation than a morose and gloomy one. Vāgbhaṭa³ adds fear as an accessory instrument. Joy and fear cause a sudden change in the temper of a man and so may be of some help in curing diseases⁴. Suśruta regards, sorrow as a śalya or foreign body which is to be removed by joy,⁵

22. AYASĀKANTA OR LOAD-STONE.

Magnet was known to the ancient Hindus⁶ and they used it

¹ तवाग्नुक्षेपयूहार काम सूत पूरोषानिलैः स्फुभाववलप्रहृतै नयनादिभ्यः पतति ।
Suśruta Sāmhitā, I. xxvii.

* सुठडो चिचिपन्नागु कथाभिर्बुदेदनाः ।

चाचासयनो वहशतनुकूलाः प्रियस्वदः ॥

* * * *

सम्पदादनुकूलाभिः कथाभिः प्रीतिनानसः ।

आग्नावान् व्याघिनोचाय चिप्र मुखमवाप्त्यात् ॥

² See foot-note 1, P. 98.

Suśruta Sāmhitā, I. xix.

³ मय हर्षीं शरीरस्य सहसा भावान्तरसुप्तादयनी यनकायं कुरुत इति ।

Vāgbhaṭārtha Kaumudi, I. xxv.

⁴ हृदयस्थित मनेक कारणीत्यपवृ शोकशल्यं हृष्टेति ।

Suśruta Sāmhitā, I. xxvii.

⁵ मधिगमनं सूच्यमिसप्तमहट्कारथकं ।

Vaiśeṣikā Darśanam, Ch. V, Āhnika 15,

to extract minute foreign bodies such as iron particles from the eyes and teeth. Suśruta¹ also mentions its use for extracting an arrow from the wound, if it be without barbs.

In modern times, a magnet is still used for removing a particle of iron from the eye. "Indeed, cases have occurred in which the application of an inch bar-magnet connected with four Grove's cells to the outside of the cornea has caused the foreign body to retrace its course and emerge through the wound"². A fragment of iron lying in the vitreous has been removed by the Snell's electro-magnet introduced through the scleral wound behind the ciliary region. "The following plan of ascertaining whether a portion of needle be really impacted has been suggested by Marshall, and successfully carried into practice by Littlewood of Leeds. A powerful magnet is to be held upon the part for a quarter of an hour, so as to magnetise the fragment; a firmly hung polarised needle should then be suspended over it, when, if any iron is present, deflection will ensue."³

23. KṢĀRA. CAUSTICS OR POTENTIAL CAUTERY.

Caustics were highly extolled by the ancient surgeons as the external applications are better tolerated by the weak and

सूक्ष्मिसंपद्यनिति सूचीपदेन लौहमात्रं दण्डोपलचयति; तथा चायकानाभिसुखं
यत् सूक्ष्मादेवमन्ते * * * * * * *

Sankara Miśra, Upaskāra.

¹ अनुलोममनववहकं मनस्य ब्रह्मसुखमयकालेन।

Suśruta Saṃhitā, I. xxvii.

² Carter's Ophthalmic Surgery, 2nd ed., P. 360.

³ Erichsen's Surgery, Vol. I, P. 343.

timid persons who are afraid of the surgeon's knife¹; though Suśruta² distinctly states: "The following persons should not be treated with caustics: weak people, children, old and timid people, etc." They even give them preference to the knife for they argue that surgical diseases are radically cured by the application of the caustics, without any possibility of recurrence. Suśruta says³: "Of all cutting instruments and their substitutes, caustics (or vegetable alkalis) are the most important, because by means of them deep and superficial incisions and scarifications may be made, derangements of the three humours may be rectified and some diseases can be treated with special advantage."⁴

For the preparation and uses of caustics, see the Suśruta Saṁhitā, I. xi.

For the application of potential cauteries, three classes of instruments are recommended.⁵

1. Darvī—it is to be made of wood and should resemble a spoon in appearance.

¹ अस्पत्तले बलि वाले पाके चातव्यं सुहने ।

दारवं मर्मं सम्भादित्विते चातवत् पाटनं ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxix.

² अदनेते चारकृत्या । तदया दुर्बलवालं स्वप्निर् भौकमर्वाङ् शूनोदरि रक्तपिणि-
गाभिमृतमती प्रवृद्धरि प्रमेहोरः चतुर्वीनद्रधा मृच्छौपद्रुतकौवायहनोऽस्त फलयोनयः ॥

Suśruta Saṁhitā, I. xi.

³ शक्वानुगच्छेभ्यः चारः प्रधानतमस्तेष्यमेयसेष्य करणाविदोषप्रत्याहिगेषकियावचारणात् ।

Suśruta Saṁhitā, I. xi.

* Ibid., Hoernle's Trans. Bibliotheca Indica.

⁴ अस्त्राय च दर्वीकृतं शलाकानामन्तमेन चारं पातवेत् ।

Suśruta Saṁhitā, IV. vi.

2. Śalākā or rods,—plain probes are mentioned for application of caustic lotions to parts of the body. But generally the ends of the probes are shaped like spoon. To this class belongs the three spoon-like probes of Suśrata and the three nail-shaped probes of Vāgbhaṭa, described before¹.

3. Kūreca,—it is a brush-like instrument.

The application of caustics has its advantages and disadvantages; and these are to be considered in their relations to the pre-anæsthetic periods of surgery. Patients are still less terrified by their application than by surgical incisions. The real value of caustics is thus summed up by Velpeau.² "Nevertheless caustics possess some advantages which can not be denied them. As they do not give the idea of an operation, they shake less the minds of the patients, they are accepted with more calmness and with infinitely less effort, than the action of the knife. Mortifying the tissues step by step, they give rise to no effusion of blood, and affect less deeply the economy than the operation, properly so called. Women treated in this way do not require to remain in bed or to consider themselves as patients. The dressings require little care, and do not demand absolutely the intervention of the surgeon. The wound cleans itself very rapidly in general, and once cleaned, it proceeds speedily towards cicatrisation. Without exempting wholly erysipelas, phlebitis or purulent infection as some surgeons have asserted, there is notwithstanding, some reason for supposing that they expose the patient somewhat less to these troublesome complications than the operation".

¹ See P. 158-159.

² Velpeau. Cancer of the breast. Marsden's trans.

25. AGNI. ACTUAL CAUTERY.

Suśruta says¹: "With regard to surgical treatment, actual cautery is said to be superior to caustics, in as much as diseases treated with the actual cautery do not re-appear, and because it can cure diseases which are incurable by medicines instruments, and caustics."² This partiality for cauteries is one of the reasons of the gradual decadence of Hindu surgery and its total extinction in the present time. To this belief of the Hindus may be compared the following aphorism of Hippocrates³:-

"Those diseases which medicine do not cure, the knife cures; those which iron can not cure, fire cures; and those which fire can not cure, are to be reckoned wholly incurable".

For the application of the actual cautery the following articles are considered necessary⁴ :—

1. Pippali or piper longum	} These are to be used for diseases of the skin.
2. Goat's dung	
3. Teeth of a cow	
4. Šara or saccharum sara	
5. Probes or ſalākā (see before ⁵)	

¹ चाराद्धिगरीयान् क्रियात् व्याख्यातसहस्रानां रोगानां मपुष्मभावादेष जगत्कारिरसाधानां तत्साम्बलादृष्टे ।

² Ibid. Hoernle's Trans. Biblio. Ind.

Suśruta Samhitā, I. xii.

³ The Works of Hippocrates, Syd. Soc., vol. II., p. 774.

* अद्यमनि दहनोपकरकनि । तदादा पिण्डवजाग्रत्तद्वेदन शरशलाका जात्यवैहतर लीहा: चीडगुड्हेहावः । तत पिण्डवजाग्रत्तद्वेदन शरशलाकाक्षमगतादृः । जात्यवैहतर लीहानि मांसगतानां चीडगुड्हेहाः सिरखात् सम्प्रस्थितानां ।

⁴ See P. 159-60.

Suśruta Samhitā, I. xii.

6. Jāmvavauṣṭha ¹	}	Used for diseases of the muscles.
7. Different kinds of iron		
8. Honey ²		
9. Treacle		
10. Ghee	}	Used for diseases of the vessels, joints and ligaments.
11. Oil		

"Both Aetius and Oribasius represent goat's dung, pounded with vinegar, as being equally efficacious as the sinapism, and applying particularly to ischiatic diseases."³ Hippocrates says that cauterisation may be performed with boxwood spindles dipped in boiling oil.⁴ In Kordofan, are used "*El kamaia*, primitive instruments used for cauterisation consisting of a piece of camel's or sheep's dung dried and impaled on a long thorn."⁵

12. Cautery knife.—This is to be used in the treatment of prolapse of the omentum in cases of abdominal injuries. The

¹ अर्जो भगवन्दरयनिनाहृदृटवकादिभु ।
मासदाही मधुचेह जाम्बवीष शुक्रादिभिः ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxx.

² मधुचिंडेन तैलेन मज्जचौट्रवसामृतैः ।
तर्केवां विविषेलौ वैदं हेहाह विशेषित् ॥

Caraka Saṃhitā, VI. xiii.

³ Adams' Commentary on Paul. vol. iii. bk. vii. sec. xix.

⁴ Hippocrates, ii. 482.

⁵ Medical Practices in Kordonfan, Third Report. Wellcome Research Laboratory, Khartoum.

prolapsed part is to be ligatured well and the cautery knife used to remove the prolapse below the ligature¹.

Cautery knife was also known to the Greeks and Romans. Galen², speaking of cancer, says that "some use heated razor blades, at once cutting and burning". Paul³ also mentions a sword shaped cautery in the radical cure of hydrocele.

13. Plates of copper, lead or iron.—In the application of both kinds of cauteries, plates of these metals are to be used to surround a tumour to prevent injury to the adjacent structures (Suśruta).⁴

Hippocrates⁵ in the treatment of nasal polypus, says that "when that occurs we must insert a tube and cauterise with three or four irons". Celsus⁶ says that this tube may be a calamus or a tube of pottery.

14. Cakradatta mentions a probe of gold for applying actual cautery to the hair follicles after the removal of the eyelashes, to prevent a recurrence of trichiasis.⁷

Albucasis similarly recommends burning the roots of hairs

¹ उदरान्मेदसो वर्णे निंगता यस्तु देहिनः ।

कवायभवासन्कोर्चो वहा सूखेष रुदितः ।

अश्रुतवेन शस्त्रेष्वच्छान्तान्धुसमाप्तं ॥

Suśruta Saṃhitā, IV. ii.

² Galen, xiv. 786.

³ Paul, vi. lxii.

⁴ यदल्पसूलं वपुतामसोस पहः समावेष्ट गदायसैर्वा ।

आराप्रिष्ठस्त्राष्टु सकृदविदधात् प्राणानहिंसन् भिषग्मनः ॥

Suśruta Saṃhitā, IV. xiii.

⁵ Hippocrates, ii. 244.

⁶ Celsus, vii. x.

⁷ See foot-note 2, p. 88.

in trichiasis with a probe of gold. Paul¹ applies a heated olivary probe or an aural probe for the same purpose. Haly Abbas and Rhazes also describe this operation.

26. BHEṢAJA OR MEDICINES.

This means such medicines as become necessary in the treatment of surgical diseases and do the work of surgical instruments to a certain extent. Suśruta gives a list of medicines,² required in the treatment of various kinds of inflammations, and I quote a few passages from the English translation³ to illustrate the action of medicines in surgical practice. "Warm poultices made of the following drugs promote suppuration, namely, fruits of *sana* (*Crotalaria juncea*), *Mūlaka* (*Raphanus sativus*), *Śigru* (*Moringa pterygosperma*), sesum and mustard seeds, flour of barley and wheat, *kiṇya* (the drugs used as a ferment in distilling spirits) and linseed. The following medicines are applied for opening abscesses, namely, *chiravilva* (*Pongamia glabra*), *agnika* (*Semicarpus anacardium*), *chitraka* (*Plumbago Zeylanica*), *danti* (*Baliopermum montanum*), *hayamāraka* (*Nerium odoratum*), and the excrement of the pigeon, vulture and heron. Caustic alkalies are also very effectual in opening abscesses. Demulcent articles, such as, flour of barley, wheat or *másha* (pulse of *Phaseolus Rur.*) promote discharge from the interior of abscesses. * * * * Pastils for fumigating ulcers should be made of *śrīveshtaka* gum of (*Boswellia Thurifera*), *sarjarasa* (resin of *Shorea robusta*), *sarala* (*Pinus longifolia*), and *devaradáru* (*Cedrus*

¹ Paul viii, xiii.

² See Suśruta Saṅhitā, I. xxxvi.

³ Dr. U. C. Dutt's Translation, Bibliotheca Indica, P. 151-154.

deodara); decoctions or cold infusions of astringent and unirritating barks should be used as washes for promoting granulations in ulcer. Tents for promoting granulations should be made of *soma* (*Sarcostemna brevistigma*), *amrita* (*Cocculus cordifolias*), *asvagandhā* (*Withania somnifera*), the plants included under the class of *kākolyddi*, and the buds of (*Ficus Bengalensis*)".

In treating inflammation, the Hindu surgeons used pastes to give relief to the pain and tension; warm poultices to promote suppuration; medicinal applications and incisions by knife for opening abscesses; denrilecent articles to promote discharges; decoctions of drugs as corrective washes; tents of drugs and lint for introducing them into the cavities of the abscesses; decoctions in oils and clarified butter to improve the character of ulcers; pastils for fumigating sores; tents, pastes, powders and lotions for promoting granulations; drugs to repress high granulations; drainage to prevent infection, and bandages to give the part rest. This shows that the Hindus were not wholly ignorant of the antiseptic methods of treating wounds; and Suśruta enjoins that a certain incense should be kept burning in the operation room.

Of the additions to the list of Suśruta by Vāgbhaṭa, we need consider the goat's gut only.

GOAT'S GUT.

The intestines of the goats, etc. are to be dried and prepared as materials of ligature¹. They should be used in ligaturing fine vessels after incision by knife, evidently to check haemorrhage.

¹ See foot note 1, P. 223.

The use of goat's gut in surgery is generally considered to have been unknown to the Greeks and Romans, as it is not mentioned in their works. But Adams points out¹ "that the strings of ancient harp were made of the guts of a sheep," and this he clearly proves from a passage in the *Odyssey* of Homer.

Hippocrates² used apolinose made of crude flax, which is also mentioned by Paul for the delegation of arteries. Rhases however describes the use of strings of harp³ as a material for suture in the operation called *gastroraphé*.

ARREST OF HEMORRHAGE.

It is generally believed and often stated in modern works on surgery that the ancients were unacquainted with the proper treatment of haemorrhage. Suśruta however enumerates four different ways of arresting haemorrhage after venesection; namely:

1. Sandhāna :—Contraction of the wound by astringent decoctions of Chebulic Myrobalan and the root-barks of the panchavalkala trees (five barks).
2. Skandana :—or thickening of the blood by the application of severe cold.
3. Pāchana :—or descicating or drying up the wound by ashes.
4. Dahana :—or cauterising the veins to make them shrink⁴.

¹ See Commentary on Paul, VI. iii. vol. II, P. 345. Syd. Soc. Ed.

² Hippocrates, iii. 132.

³ Rhases. Cont. xxviii.

* चतुर्विधं यद्यतदि रसिरस निवारणं ।
सम्भासं स्तन्दनयोद्य पाचनं दहनं तथा ।

If the blood does not thicken by the application of cold, astringents should be applied; if these fail ashes should be used. By means of these three modes, the physician should endeavour to the best of his abilities to stop the bleeding, but if success be not still obtained, cautery may be resorted to as the absolute effective means¹. To stop bleeding from an artery, he advises us to apply astringents and pressure with the fingers. Vāgbhaṭa² also describes these methods of arresting haemorrhage, and advises us that if the ordinary means do not check the bleeding, the vessel must be again opened at a point in its course beyond the bleeding area, or actual cautery applied. Cakradatta also repeats these directions³.

Vāgbhaṭa however mentions the sheep's gut amongst the accessory instruments. His commentator explains its use for

तथा कवायः सम्बर्त्त रक्तं लक्ष्यने हिमे ।

तथा सन्धाचयेद्वधं दाहः सहीचयेत् सिरा ॥

Sufruta Saṅhitā, I. xiv.

¹ अस्त्रदमाने श्विरे सन्धानाति सहीचयेत् ।

सन्धाने भग्नदमाने तु पाचते: समुपचारित् ॥

कल्पेरेत्तेजिविवद्यः प्रथमेत यथाविविधः ।

अस्त्रिहिमत्सु चैतेषु दाहः परमं इष्यने ॥

Ibid.

² रक्ते लतिहति चिप्रं क्षम्यनौसाधरित् कियान् ।

खोड्रं चियहु पतहु मापयत्वाह गोरिकेः ॥

मतकपालाद्वन्द्वीम नदी दीरोत्तमहुर्वे ।

विचूर्णयेद् भवसुखं पश्चकादि हिमे पिवेत् ॥

तामिव वा शिरो विष्वेदाधान् तथादमलर्व ।

विरामुर्व वा लिरितं दहित् ततगलाकथा ॥

Aṣṭāṅga Hṛdaya Saṅhitā, I. xxvii.

¹ See Cakradatta, Śicāvyāḍhādhikāra.

ligaturing blood-vessels¹. Suśruta says that if in venesection, or in treating wounds, excessive bleeding occurs, it should be stopped by proper means².

Celsus³ advises us to fill up the wound with dry pledgets, then to apply a sponge squeezed out of cold water and to press with the hand. If not successful, cut the vessel asunder between two ligatures, or apply cautery, or try the method of revulsion. Galen⁴ applies pressure by finger on the wounded vessel, or twists it moderately. If the vessel be an artery, he gives the alternative of a ligature or cutting across. Paul⁵ mentions all the methods to stop the bleeding, *viz.*, pressure, styptics, ligature, escharstics, and cauteries with fire.

Albucasis⁶ mentions four methods of stopping the discharge of blood from an artery :

1. By cautery.
2. By dividing the artery across.
3. By using the ligature.
4. By styptics and bandage.

Avicenna⁷, Rhases⁸ and others also mention these methods

¹ अनं मेदादीनो युक्तान् तां इत्यातं शक्त्वा दाक्तनरं स्फ्रसिरादिवभनादिर्बु युज्यते ।

Vāgbhaṭṭartha Kāmudi, I. xxv.

² देखेत्विभिन्नैरहुया योनिते प्रसुते भवते ।

काचे यदोऽप्तेन योनितस्यापनं भवेत् ॥

Suśruta Sañhitā, IV. i.

³ Celsus, v. 26.

⁴ Galen, Metab. Med. v.

⁵ Paulus Aegineta, IV. iii. vol. II. P. 127. Syd. Soc. Ed.

⁶ Albucasis. Chirurg. i. 58.

⁷ Avicenne Cantic. ii. 2., and Collig. vii. 23.

⁸ Rhases, Divis i. 39; Contin. xxviii.

for arresting haemorrhage. Thus it becomes apparent that the use of ligature for stopping bleeding was well known to the ancient surgeons and the present methods of arresting bleeding are only the revival of the old practice. Adams¹ concludes: "It appears, therefore, that the use of the ligature for stopping hemorrhages was well understood by the ancients, and had never been lost sight of even in the darkest ages."

¹ Adam's Commentary on Paul, vol. II. p. 132.

CHAPTER VI.

THE ŚASTRA OR THE SHARP INSTRUMENTS.

1. THE MAṄDALĀGRA OR ROUND HEADED KNIFE.

It is described as a round or circular headed cutting instrument, having a length of six aṅguli. Two sub-varieties are noted —one with a circular edge and the other shaped like a razor (Dallaṇa).¹ Vāgbhaṭa², however, describes the blade to be shaped like the index finger when its nail points towards the palm of the hand. This would then resemble the decapitating hook of Ramsbotham.

It is said to have been principally used for the operation of cutting through and scraping³; so it is recommended to be used

¹ मरुडलानिंदाय वस्तु तत् मरुडलाय तच्च दिविधम् तथाहि—

यदेष्ये मरुडले हन् चुर संस्कारमेव वा।

मरुडलायस्य जानौयात् प्रमाणन् यदुद्गुलम्।

Nivandha Saṅgraha, viii.

² मरुडलाय फले तेषां तज्जननंखाङ्कति।

लिखने केदने दोञ्ज योषकी शुष्किकरदिषु॥

Aṣṭāṅga Hṛdaya Saṅhitā, I. xxvi.

मरुडलाय, मरुडलाय नाम ग्रस्तं, फले, फल प्रदेशे, तज्जननंखाङ्कति स्त्रात्, अनः, अनहिंतो नस्तः, अनर्थः, तज्जना अनर्थः, तज्जननंखः, तस्त्रवाङ्कति राकारी यस्य तत् तज्जननंखाङ्कति। तच्च पोषकी गलयशुष्किकादिषु, लिखने, लिखन कर्मणि, तथा केदने, केदन कर्मणि, योञ्जः।

Vāgbhaṭārtha Kaumudi, I. xxvi.

फलोहृषे तज्जना अनर्थंखलंज्ञनंखलंख्येवाङ्कतिर्यस्त तद्वक्त्।

Sarvāṅga Sundari, I. xxvi.

³ तत् मरुडलायकरपते क्षातो केदने लिखने च।

Suśruta Saṅhitā, I. viii.

in the operative treatment of enlarged tonsil¹. It is also advised to be used for piercing the skull of a dead foetus in utero to help its easy extraction by other instruments. So any other presenting part causing difficulty in the delivery of the dead foetus, is to be cut with it. It is claimed that there is less likelihood of damaging the soft parts of the mother by this instrument than by the sharp pointed vrddhipatra.²

We find that Suśruta recommends a maṇḍalāgra knife in ophthalmic practice for scraping away the membranous expansion in the operation of pterygium³ and other ophthalmic operations,

‘ अङ्गुडाहृतिसन्देशनाकृष्ण गलयुक्तिकां ।
हेदयेन्द्रियस्थलाये च जिङ्गोपरि तु संस्थिताम् ।
नोत्कृष्टचेव हीनव विभागे षट्दयेतिष्ठू ॥

Suśruta Saṃhitā, IV. xxii.

* तत्र लियमाशास्य नष्टलाये शाङ्गुडी श्वेत वा शिरो विदार्थं विरक्तपातान्वाहत्य शहुना एवैलोरसि कवायो ल्पयहरेदिमिद्विरिति चाविकुटे गच्छ च। असंसंसक्तस्थांसदेवै शाहुं किंत्वा इतिमिवातते वातपूर्वोदरं वा विदार्थं निरस्यात्वाणि पिदिलीभूत माहरे ल्पयनसक्तस्था वा लघनकापालानौति ।

यद्य, यद्युं इ गर्भस्य तस्य स्त्रजिति तटिष्ठू ।
सम्बन्धिनिर्भरेचिकित्ता रचेदारीच यवतः ।
गर्भस्य गतयचित्ता जायन्तेऽनिलिकोपसः ।
तत्रानात्प्रमतिष्ठूयो वस्त्रे त विचिपूर्वकं ॥
नोपेचित स्वतं गर्भं मृहुत्तं भवि पश्यितः ।
सच्चागुणं जननीं हन्ति निरस्यासं पगुं वद्या ॥
मरुष्टलाये च कर्त्तव्यं हेदयमन्तर्विजानता ।
इहिप्रतं इ तौचायं नारों हिस्पात् कदाचन ।

Ibid, IV. xv.

* अर्घ्यं यव बलीजाते तवे तत्त्वगर्वद्य भिषक् ॥
अपाहुं प्रे चमाशस्त्रं चिह्नेन समाहितः ।
सुनुष्यामृद्धं भेदावौ मूर्चीसुतेष वा पुनः ॥
न चोक्त्वापवता चिप्रं कार्यमध्युद्धनं तु तत् ।

such as for vascular net-work and nodules on the eyeball¹. Cakradatta says² that if the pterygium extends to the black part of the eye, the membrane is to be raised by the point of a needle, transfixed by a vadīśa or hook, and leaving the pupil free, is to be excised, as Sivadāsa³ explains, by the mandalāgra. He also uses it to scrape away the root of any new growth in the eye⁴ and to perform the operation of scratching in ophthalmic surgery⁵.

शस्त्रपातभयादासु वर्ष नी याहयेद् दड़ ॥
ततः प्रशिविलीभूते विभिरेव विलम्बित ।
उहिख्यन्मण्डलायेण तौलो न परिशोधयेत् ॥
विमुक्तं सर्वतदापि कृचाक्षुलाद भग्ननात् ।
नौला कनोनकोपालं हिन्दादाति कनोनकं ॥
चतुर्मासस्थिते नासे नाचि व्यपतिमहंति ।

Sūkruṭa Saṁhitā, VI. xv.

¹ सिराजाले सिरायाम् कठिनाकाश तुषिमान् ।
उहिख्येन्मण्डलायेण वडिशेनावलम्बितः ॥
सिरायु यिङ्काजाता या न सिभ्यनि भेषजैः ।
चर्मवन्मण्डलायेण तासाञ्जेदनमिव्यते ॥

Ibid.

² अर्थं तु चेदनौर्य सात् कृचापाते भवेद्यदा ।
वडिशविहसुद्रव्य लिमागच्छात्र वर्जयेत् ॥

Cakradatta, Nētraroga Cikītāś.

³ अर्थकेदनौर्यमिति मण्डलायेणेति ग्रेषः । समुद्रमेति सूचयेणेति ग्रेषः । सूचयेण
समुद्रम्य उत्तोर्य अनन्तरं वडिशेन विहा मण्डलायेण किदयेदिल्वयः ।

Tattva Caṇḍrikā, Netraroga Cikītāś.

⁴ अर्थकायादभ्यनात्ता युक्तार्द्दिव्यं दसेव च ।
मण्डलायेण तौलो या मूलेच्छिन्द्याद भिषक् श्वेतः ॥

Cakradatta, Netraroga Cikītāś.

⁵ भिलोपनाह कफञ्जं पिपली नधूसैन्धवैः ।
विलिखिन्मण्डलायेण प्रक्षयेदा समन्वतः ॥

* * * *

A small instrument with a broad blade and a rounded cutting tip is figured by Albucasis¹ in connection with ophthalmic work. This was the scalpel for the plastic operation on the eyelid as for trichiasis. Incisions were made by this knife on the eyelids in such a way as to enclose a leaf-shaped area which was then dissected off. The lips of the incisions were then united with three or four sutures². Paul³, quoting Aetius⁴, describes the operation for pterygia :—" Having separated the eyelids, and seized upon the pterygia with a hook-like instrument, having a small curvature, we stretch it, and taking a needle having a horse-hair and a strong flaxen thread in its ear (eye ?), and a little bent at the extremity, we transfix it through the middle of the pterygium, and with the thread we bind the pterygium and raise it upwards, while with the hair we separate and saw as it were the part at the pupil away unto its extremity ; but the remainder of it at the great canthus we cut off from the base with the scalpel used for the operation by suture, but leaving the natural flesh of the canthus, lest there be a running of the eye when it is taken away. Some stretching as aforesaid with a thread, dissect away the whole pterygium with the instrument called pterygotomos, taking care not to touch the corner."

Cakradatta mentions the use of the mandalāgra for scarifying

मृतसैन्यव चूर्णन कफानाहं पुनः पुनः ।

विलिकेश्वरप्रलाये च मक्षयेदा समन्वतः ॥

Cakradatta, *Netraroga Cikitsā*.

¹ Milne, Greco-Roman Surgical Instruments, Pl. ix. fig. 3.

² Paulus Aegineta, VI. viii.

³ Ibid, VI. xviii.

⁴ Aetius, II. iii. 60.

the tongue for bleeding in the disease called *jihvākāntaka* (prickly tongue)¹. He also uses it in *adhijihvā* or ranula and says: "The tongue is to be raised, the ranula is to be drawn up and fixed by a sharp hook, and then excised by the *maṇḍalāgra*. Afterwards a strong gargle is to be prescribed".² Pālakāpya³ also describes it to have a length of nine *aṅguli*, the handle being six, and the blade three *aṅguli* long. The end is full-moon-shaped and it is directed to be used for scarification on the eyeball.

It seems that *maṇḍalāgra* of different sizes and shapes were used. For the instrument used for perforating the foetal cranium in uterus would scarcely be thought fit for a delicate operation on the eyeball.

Soranus⁴ mentions a special instrument for perforating the foetal head. Rhases⁵ directs us to open the head when the child's cranium is large and cannot be brought down. Haly

¹ करटकेषु कफीत्वेषु लिखितेष्वस्त्रः चये ।

पिपलादिर्मधुकुतः कार्यन् प्रतिसारकम् ॥

Cakradatta, *Jihvāroga Cikitsā*.

लिखितेष्विति मधुलादिना ।

Tattva Candrikā, *Ibid.*

² उद्धाम्य जिह्वामाक्षय वहिग्रेनाधिजिह्वाकाम् ।

हेदयेन्द्रलक्ष्येण सौषांश्चैलवलादिभिः ॥

Cakradatta, *Mukharoga Cikitsā*.

³ लिखनं मधुलाप्रेण कर्त्तव्यं दलिनो भवेत् ।

Pālakāpya, III. i.

पूर्वचन्द्राकृत्यायमधुलाप्यम् लिखनाद्यमक्तो ।

Pālakāpya, III. iii.

⁴ Soranus, II. viii., P. 366.

⁵ Rhases, Cont. xxii.

Abbas¹ also advises us to open the head when it is preternaturally large. Actius² also gives a similar discription. Some authors recommend the polypus-scalpel or the phlebotome in embryotomy. The embryotome figured by Albucasis³ is a straight two-edged blade, and we may conjecture that the mandalāgra used by the Hindus for perforating the foetal cranium was a similar instrument.

2. KARAPATRA OR SAW.

It literally means, "an instrument having the blade in the form of a hand", the fingers being represented by the teeth of the saw. Others explain, as Dallana⁴ points out, the name from its resemblance to a carpenter's saw. It seems that saws of various sizes were used. Suśruta mentions its length to be six aṅguli, Vāgbhaṭa⁵ describes it to be ten aṅguli

¹ Haly Abbas, Pract. ix. 57.

² Actius, XVI. 23.

³ Graeco-Roman Surgical Instruments, Pl. viii. fig. 7.

* करपत्रमिति करपत् पवं करपत्रं यदा करोऽहुलिभिराचितो भवति तत् यत् कषट्कैरचितं स्वास्त् करपतसुचते । अन्ये तु करपतशर्षं करपत्राकारमेव तत्र दादशाहुलं तत्त्वान्तर वचनात् । ननु यदि तत्त्वान्तरात् दादशाहुलं करपतसुचते तद्विं स्तत्त्वे विद्येः कुतः स्तत्त्वे करपतश्च चिह्नितप्रसाकलात् शेषानि तु पड़ुलानि इत्यमेन वाक्ये न पकाहुलमेव करपतम् स्वास्त्र दादशाहुलं नैवम् नेपाम् नामाभिरेवाक्तव्यः प्रयिष्य ल्यास्ताता इत्यस्तात् स्वास्त्रं प्राप्तः इत्योऽनुवत्तं नेतनावसर्वं शेषानि प्राप्येष पड़ुलानि एवं शब्दमानेऽन्यवाच्यविरोधः ।

Nivandha Saṃgraha, I. viii.

* लेण्डुला करपतनु स्वरधारे दशाहुलं ।

विकारे दाहुलं स्फङ्गदनं स्तम्भक वन्मने ॥

Aṣṭāṅgā Ḥṛdaya Saṃhitā, I. xxvi.

करपत्राद्या शास्त्रमाह किंदे इत्यादि करपत् पवं यस्य तत् करपतं अहुलिभिराचितो यथाकारो भवति तद्वयत् कषट्कैरचित्तं तत् करपतसुचते । करपतं करात् यथात् । करपत्रं स्वरधारं, द्वारा, तौचा, धारा यस्य तत्त्वाविधम्, तत्र दशाहुलम्,

long and two aṅguli broad ; while Bhoja¹ alludes to a saw, twelve aṅguli long. The edge of the instrument is described as rough and serrated ; and this is the only instrument that need not have a very sharp edge.

The handle of the saw should be well formed and pegged. Its principal use is to saw a bone. Sometime it is recommended for the purpose of scraping.

Saw is frequently mentioned by the Greek and Roman authors in the descriptions of operations on the bones. Celsus² mentions it in describing the amputation of a gangrenous limb. With reference to fractures of the bones of the head, Paul says³: "But the mode of operating with saws and the instrument called cheenicides or modioli (trepans ?) is condemned by the moderns as a bad one." Evidently he means flat cranial saws. Galen⁴ also mentions the "knife-shaped saws."

In modern times the saw is still used for identical purposes in surgery.

There is no mention of trephine in Hindu surgery though Jivaka (500 B.C.) is said to have practised cranial surgery with success⁵. Pandit Vallala describes⁶, in his Bhojaprabandha or

दैव्यं दग्धाङ्गुलं परिमाणं, तदा विलारि हाइनं, परिसरे अङ्गुलशयपरिमितं तदा शूल
दनं सक्ता दलाकारा दन बस्त्र तत्त्वाविधि, तदा स्त्रूपसहवन्नां, तसक खड़्गादि सुधि:
वन्ननं, कोलादिना वन्ननं, तसक्षय वन्ननव ते तसक वन्नने, शीघ्रने तसक वन्नने बस्त्र तत्त्वा-
विधि' । तद्य अस्तु इदै, क्षेदन कर्त्त्वनि योज्य' ।

Vāgbhaṭārtha Kaumudi, I. xxvi.

¹ See foot-note 4, P. 230.

² Celsus, VII. xxxiii.

³ Paul, VI. xc.

⁴ Galen, XVIII. 331.

⁵ See Mahāvāgga, VIII. 1.18. Sacred Books of the East. Vol. xvii.

⁶ See foot-note 1, p. 60.

Anneedotes of King Bhoja, a surgical operation performed on the king. He was suffering from a severe pain in the head. Medicines did him no good, and so to give relief, surgical interference was thought necessary by two brother surgeons who happened to arrive in Dhar at that time. They are said to have administered a drug called summohini to render him insensible. They then trepanned the skull and removed the real cause of his complaint. They closed the opening, stitched the wound and applied a healing balm. They are then said to have administered to the king another drug called sañjibani to accelerate the return of consciousness.

Trephine was well known to the ancient Greeks and Romans. Hippocrates¹ mentions a trephine or a saw having a circular motion, in the treatment of injuries to the head. Paul also mentions trephine, the use of which is, he says, condemned by the moderns. Sprengel² remarks, that "Galen was averse to the use of the trepan, though he performed the operation on the head occasionally."³

3. VRDDHIPATRA.

This sharp cutting instrument is called vrddhipatra from its resemblance to the leaf of a medicinal plant called vrddhi. Two varieties of this knife are described by Vāgbhaṭa⁴—one is

¹ Hippocrates, III, 371, 374.

² Hist. de la Méd., 18.

³ Adam's Commentary on Paul, VI, xc, Vol. ii., p. 430.

⁴ वृद्धिपत्रं लकड़ाकारं क्षेत्र मेदन पाटने ।

वृद्धिपत्राते शोफ गच्छारि तु तदन्वय ।

नताम् पृहरी दीर्घं इस्तवक् यथायद् ॥

straight throughout and it is to be used for opening pointed superficial abscesses; and the other has the end bent or curved. Again amongst the second class of curved knives, some have their ends long and therefore called dirgha-vaktra or long-mouthed, and these are to be used for opening the deep seated abscesses, while others have their ends short and therefore called hrasva-vaktra or short-mouthed, and these are to be used for superficial abscesses that would not point. Suśruta describes them to be six aṅguli long. Dallāṇa in his commentary¹ says:—Both the varieties, one with a curved,—and this is called a kṣura or razor,—and the other with a resected point, should be seven aṅguli long; the handles and the blades should measure five and a half and one and a half aṅguli respectively.” These are to be used for cutting through a part, partially or completely, and also for puncturing it.

इहिपवास्त्रो शस्त्रमाह इहिपवनियादि इहिपवं नाम शब्दं, चुरुकारं, चुराकृति, चुरय लोमस्तेंद्रिकः शस्त्रविशेषो नरमुन्द्रायाः। तथा इहिनामीपव इच्छन् पवसद्ग्रहणकर्त्तव्यं इहिपवास्त्रं लाभते। तदै इहिपवं नाम शब्दं क्षेत्रे मेदने च वार्ण्यविद्योव्यनिति चक्षयनियादिना विश्वविशेषे इहि पवस्त्राकारं मेद उच्चाते। यत् इहिपवं चक्षयन् चुरुकारं चापलायनियवः। तत्, उद्बन्ने, उचितै, शोके, शोथे, योज्यः। शक्तीरि, मेद आदि धातुश्च शोके, तथा तदन्तरा, अनुव्रते च शोके, यत् प्रठत, प्रहर्देशे नताय वक्तीभूतायभागं, कुचितायभिलयः। तत् इहिपवं शब्दं यथावद् दीर्घं इस वक्तं, दीर्घं सुखं, इस सुखं च योज्यः। यथावद्यनिति शक्तीरि शोके दीर्घवक्तं, अनुव्रते च शोके इसवक्तायभिलयः। अत दिविष्य इहिपव शस्त्रयुक्तम्, वे अपि सनात्रुत्प्रमाणे, योरपि आदेपवाहुलं हन् कार्यं साहाय्युक्तं कलमिति। मेदनै, मेदै, एकचिन् शारीरदेशे शस्त्रमाववाद्य अपर दिग्मा शस्त्रायस्य निष्काशनं मेदनै। पाटने, विदारणं फाइन इति लोके।

Vāgbhaṭārtha Kanmudi, I. xxvi.

¹ इहिपवनिति, इहि: पवनिव इहिपवं तथा विषिष्य एकं अचितादें, वितीर्वं प्रयताय, वे अपि सनात्रुत्प्रमाणे योरपि अतं पवाहुलं हन् कार्यं दाहात्रुत्प्रमाणम् फलम् इति अनयोर्बन्धे अचिताय इहिपवं चुरमातुः।

Nivandha Saṅgraha, I. viii.

One form of the vriddhipatra resembles in shape the razor used by the barbers,—not the English razor that has now become common in Bengal, but the country-made razors which are still used by the barbers in the North-West Provinces.

Suśruta recommends the use of razor, scissors and pinchers for shaving the parts before operation; for “the hairs”, he says, “prevent the healing up of the wound rapidly”¹. He again uses vriddhipatra as a knife and observes:—“If bitten by spiders whose bites are amenable to treatment, the area of the wound should at once be excised out by the vriddhipatra, and then actual cautery applied by the red-hot jāmvavauṣṭha probe till the patient requests for its withdrawal”².

Suśruta uses the vrddhipatra knife for the removal of the scrotal tumour and says³: “The scrotal tumour is to be well fomented and bandaged. The patient should then be cheered up, and leaving the testicles intact, underneath the median raphe, the tumour should be excised by vrddhipatra knife. The fatty tissues being

¹ राजाकौरीं वर्णो यतु न सम्बुपरीक्षितः ।
चुरक्करीसन्देशे कासारीमाघि निहरेत् ॥

Suśruta Saṃhitā, IV. i.

² साधाभिरामिनुताभिदृष्टमावस्य देहिनः ।
इहिपतेष्य मतिनान् सम्बगादेष्यसुहरेत् ॥
जाम्बुष्टमाघि तसेन देहेदाकर वारवान् ।

Ibid, V. viii.

³ सिंद्रो चारिट्ट पटेन समाशास्तु मानदं ।
रचेत् फले सेक्तोश इहिपतेष्य दारयेत् ॥
मेदस्तः सम्भूत्य दथात् काशीसंस्थेवे ।
बध्नीयाच यथोद्दिट्ट ।

Ibid, IV. xix.

removed, powdered ferri sulphur and rock salt are to be dusted over the wound and proper bandages applied."

Vṛddhipatra was also used by the ancient veterinary surgeons. Joyadatta Suri writes¹: "The knife known as vṛddhipatra is shaped like a kṣura or razor. It is three aṅguli long and should be used by the wise to incise a suppurated abscess". In Pālakāpya², we find that "it is ten aṅguli long; the handle being six aṅguli and the blade four aṅguli long and three aṅguli broad. It is used for seision and excision". He uses it also in opening a sinus after well ascertaining its course by means of a probe³.

Hypodermic medication:—The use of hypodermic syringe was not known to the Hindus. They were acquainted however with the hypodermic method of exhibition of drugs. Śārṅgadhara⁴

¹ वाहूलं इतिपवच्च चूरकारं प्रकोपितम् ।
प्रकशेषादिषु प्राणः पाटने तेन कासयेत् ॥

Aśvavaidyaka, XIV. v. 22.

² यस्तेष इहिपत्रे च वाऽसि(शि)तेन सि(शि)तेन वा ।
शब्दकर्मणि निषातः सुपद्ध' पाटर्यहिपत्र ॥

Pālakāpya, III. iv.

इहिपत्रे च नामानां कुर्याच्चेदनं भेदने ।

Pālakāpya, III. i.

³ अय चिपगदनाधायोहेन विधिना सुविनितं वारकमभिशास्त्राऽङ्ग(शि)व स्त्रानुनामं
गतिभन्तं सत्यमुद्धं नाडीत्रयमेषथवा च विदित्वा इहिपत्रे च शब्देषानुज्ञोऽप्यप्रतिरक्षाद्य-
च्छेदं कुर्यात् ॥

Pālakāpya, III. xv.

⁴ प्रवयिवा 'शुरेणाङ्ग' केवलानिलपीडितम् ।
तत्र प्रदेहं दद्याच्च पिट' गुष्ठाकैः कृतम् ॥
तेनाववाहृता पौडा विपचौ रट्टसौ तदा ।
अन्यापि दातजापीडा प्रगम्भं याति चेगदः ॥

Śārṅgadhara Saṅgraha, III. xi.

directs us to scarify a part with a razor and then apply an ointment of guñjā (Abrus precatorius) in sciatica, scrofulous glands of the neck, etc. For treating a person in the state of unconsciousness caused by the derangement of all the humours, he directs us to scarify the anterior fontanelle with a razor, then to apply as much medicine as can be carried on the point of a needle to the part and rub it with fingers¹. The medicine is to be prepared thus :—take aconite 1 pala, quicksilver 1 sāna; mix, and put inside two sorābas or earthen basins smeared with powdered glass and placed face to face. Apply some external application over this and put it on fire for six hours. Then open the basins, take the soot collected on the upper basin and deposit it in a glass vessel quickly to prevent exposure. Cānka² also advises us to apply a medicinal paste on a cranial incision, shaped like

¹ विदं पद्धनितं सूतः शाणिकवर्षयेहयम् ।
तत्पूर्वं सम्पृष्टे च कुडा काषलितकरायोः ॥
सुदो दख्वा च संशोध्य तत्पूर्वां निरेहयेत् ।
इच्छं ग्रन्तः ग्रन्तं कुर्व्यात् प्रहस्तयं संख्याया ॥
तत उत्पाद्य तन्मुदामुपरिष्ये सरावके ।
संख्यी यो भवेत्तुम्; तं गरजीदाच्छन्तः शन्तः ॥
वायुस्पर्शी वद्या नस्यात् ततः कुर्व्या निरेहयेत् ।
रसः शूचीमुखेतप्रकृत्या नियांति भेदजम् ॥
² तापन्नाचो रसो दैर्यो मूर्च्छिने सुद्धिपातिनि ।
पूरिकं प्रक्षिने मूर्च्छु तदहुल्या च वर्धयेत् ॥
रक्त भेदजं सम्पर्काम्भुर्चिह्नोऽपि हि जीवति ।
तदैव सर्पदेहस्त वसावय्योऽपि जीवति ।
यदातापो भवेत् तत्र भवेत् तत दीपते ॥

Sārhgadharas Saṅgraha, II. xii.

¹ विषद्वित कफनार्दः सौतमरीधकालवायुयः ।
वत्तद्व इमेष्वर्यः सादसाखलिहेविष्वीनयः ॥

the foot of a crow, in case of snake-bite when he becomes unconscious but his life is not completely despaired of.

4. NAKHA ŚĀSTRA OR NAIL PAPER.

Suśruta¹ mentions its length to be eight aṅguli. Dallaṇa² says that its blade is two aṅguli long and one aṅguli broad. Vāgbhaṭa³, on the other hand, describes the length to be nine aṅguli. Aruṇadatta⁴ thinks it to be a double instrument, one end having a straight edge and the other an oblique one. Some explain⁵ that two different kinds of nakha śāstra—one with a straight and the other with an oblique edge—are directed to be used.

चन्द्रकपाया; कालं विलसम् मूर्ति काकपदमभ्यः ।

हत्वा कुर्यात् कटभी कटुकोटफला प्रधमनवः ॥

Caraka Saṃhitā, VI. xxv.

¹ तत्र नखशर्करेष्वात्राहुते मृग्योचद्यते ।

Suśruta Saṃhitā, I. viii.

² नखशर्मनिति नखानो हिंदनाय शर्म नखशर्म तसा फलं वज्राहुतावामम् एकाहुतं विशृतम् ।

Nivandha Saṃgraha, I. viii.

³ वक्तुंधारं हिसुरं नखशर्म नवाहुते ।

सूक्ष्मशर्मोहुतिर्हेदोद प्रच्छान्ते सेखने ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

⁴ नखशर्म नखशर्मेदकं प्रसिद्धं । तत्र यका कर्जुयथारा यस्त गदेवम् । तत्रेकं सुखं वक्तमनवहन्तु र्पदम् ।

Sarvāṅgaśāradārī, I. xxvi.

⁵ नखशर्ममाह वक्तुंधारेनियादि नखानो हिंदनाय शर्म नखशर्मे तत्र हिसुरं विर्हिः प्रकारं सुखं यस्त तहिसुरं तत्वा वक्तुंधारं एकं वक्तुंधारं धारं चपरम् वक्तुंधारं स्थानं यस्य नवाहुते उभयोरपि द्वयेण नवाहुतपरिनितं तत्र नखशर्म शर्मोहुतादौ योज्यं ग्रन्थानां कर्त्रकदीनामुद्भूति रहरेऽग्न्योहुतिः प्रच्छान्ते चेरा इति यस्य प्रसिद्धिः सेक्तने चोचन् इति लोके ।

Vāgbhaṭārtha Kaumudi, I. xxvi.

They are principally recommended for cutting, puncturing and scarifying¹; and also for the extraction of needles and minute foreign bodies from the soft parts.

There is no mention of a many-bladed scarifier in the surgical books of the Hindus, but its office was performed by the *nakha śastra*, in wet cupping, by making parallel incisions close to one another.

Paul² alludes to an instrument compounded of three blades joined in such a way that at one stroke, three scarifications were made; but he prefers a single scalpel for the purpose.

Pālakāpya mentions an instrument called *rampaka*³, having the handle ten aṅguli and the blade three anguli long. It is to be used for paring the nails and cleaning the feet of the elephants.

5. MUDRIKĀ.

It is described to be a cutting instrument of the size of the last phalanx of the index finger⁴; it is also called aṅguli-śastra or finger-knife. Vāgbhaṭa describes this instrument but not clearly. He says that the mouth of the aṅguli-śastra looks as if coming out of a ring, and the blade is half an aṅguli wide. A ring, having the size sufficient to admit the terminal phalanx of the index

¹ इहिपव नखशस्त्र सुदिकोपलपदकाहै भारानि देवने भेदने।

Susruta Saṃhitā, I. viii.

² Paulus Aegineta, VI. xli.

³ रम्पकन्याहृतसुक्ष्मो दग्धालङ्घन पादशोधनाद् नखचेदनाये चेति।

Pālakāpya, III. xxx.

⁴ प्रदेशिन्द्रियपर्णप्रदिशप्रभागासुटिका।

Susruta Saṃhitā, I. viii.

finger, should be soldered to it. The base of the instrument has a thread tied to it¹.

It is recommended to be used for cutting through neoplasms in the throat. In its uses, Vāgbhaṭa says that it resembles the maṇḍalāgra and vṛddhipatra; and so was sometimes required for perforating the skull of a dead foetus in the uterus of its mother².

Dr. Simpson of St. Andrews (1744) is said to have invented an instrument, a “ring scalpel” for opening the skull. It consists of a loop of steel, through which the finger is to be passed

कुर्याद् अङ्गुलिमध्यकं ।
सुट्रिकानिर्गतसुखं फलेददौड़ुलायते ।
योगतो इहिपवेष मण्डलायते वा वा समे ।
तत्प्रदेशिन्द्र्यं पञ्चप्रमाणापूर्णं सुट्रिकम् ।
सूत्रवद् गलसोतो रोगादृदनं भेदने ॥

* Asṭāṅga Hṛdaya Saṃhitā, I. xxvi.

कुर्यादिवादिना अङ्गुलिमध्यकं व्यक्ति । सुट्रिका अङ्गुलीयेण निर्गतं निष्कृतं सुखं
यस्य तस्याविधे सुट्रिकानिर्गतसुखं तथा फले फलोद्देशे अङ्गुलायते अङ्गुलायते विकार
अङ्गुलि शस्त्रकं अङ्गुलिनाम शस्त्रं कुर्यात् । तत्र योगतः प्रयोगे इहिपवेष मण्डलायेण
वा समनुल्लं भवति । लेखने चेदने इहिपवत् योज्यं किञ्चा हेदनं भेदनं पाटने
मण्डलायते योगमिलत्यः । तदित्यादि तदहुलि शस्त्रकं प्रदेशिन्द्र्यं पञ्चप्रमाणापूर्णं सुट्रिकं
कुर्यादिति योज्यं । वैदाम्बा पर्दिग्नी नाची अङ्गुलि संसाधा अच्यु यद्यपर्वत तस्या तस्य यत्
प्रमाणं परिमाणं तदर्पणा तत्र प्रवेशोपयुक्ता सुट्रिका वस्त्रा तत्स्याविधे । सुट्रिका सुदर्दी
आकटी इति वा ज्ञाता । तथा सूत्रवद् सूलदेशे सूत्रवद् तत्र गलसोतो शतानं
रोगादा हेदने भेदने च योज्यं ।

Vāgbhaṭārtha Kaumudī, I. xxvi.

* विष्णवो नाम तौ सूदी शस्त्रदारकमहतः ।
मण्डलाङ्गुलि शस्त्राभ्यो ततकम्भे प्रशस्तते ।
इहिपते हि तौकार्यं न वीकारवारवेत् ॥

* Asṭāṅga Hṛdaya Saṃhitā, II. ii.

and from which protrudes a sharp pointed blade about an inch long, by which the cranium was pierced¹.

In the pseudo-Hippocratic treatise² a knife to fix on the thumb and dismember a fetus in utero is mentioned. This knife is called by Turtullian³ the "ring knife", whereby the limbs are advised to be cut off in the womb. It is interesting to point out that mudrikā also means a ring.

The veterinary surgeons still use a scalpel blade mounted on a ring⁴, through which a forefinger is passed to dismember foals and calves in exactly the same way.

6. UTPALAPATRA.

This knife is described to have the shape of a petal of the blue lotus. The end is long, sharp and pointed. The utpalapatra is dīrgha-vaktra or long bladed, while the arddhadhbāra is the hrasva-vaktra or short bladed knife⁵. It is to be used for cutting through and puncturing the parts.

¹ Ed. Med. Essays, vol. V, Part I, P. 445.

² Hippocrates, I. 463.

³ De Anima, 26.

⁴ Greco-Roman Surgical Instruments, Pl. vii. fig. 1.

दीर्घं क्रम्बकं यदायर्थं ।

उत्पलाभृंधाराल्पे मेदने हिंदने तथा ॥

Asṭāṅga Hṛdaya Saṃhitā, I. xxvi.

उत्पलपत्रास्यभृंधाराल्पे शास्त्रे चाह उत्पलविद्यादि उत्पलस्य अध्यांधारस्य ते आस्ते यद्योः शस्त्रयोः से उत्पलाभृंधाराल्पे शस्त्रे तथा, यद्याक्षम् दीर्घं क्रम्बकम् वज्रे भवतः । तथा उत्पलाल्पे दीर्घवक्त्रं, अध्यांधाराल्पे इक्षुवक्त्रमित्येऽस्मि । उत्पलशब्दे न उत्पलपत्रास्य शस्त्रं गमने तन्मात्रदण्डनात् । तस्य फलस्य उत्पलपत्रकारस्यादुत्पलपत्रमिति चंचित्तम् । अधिकमात्रं चारा यस्य तत् अध्यांधारं । हनकलयोर्मध्ये फलसंग्रह किञ्चिदधिक दैर्घ्यमिति वर्तते । तत्र अटाहुलावत् उत्तरमि चारुल विकारं ।

Vāgbhaṭārtha Kaumudi, I. xxvi.

In the Aśvavaidyaka, the utpalapatra and vrihipatra knives are recommended to be used in puncturing the veins in phlebotomy¹. "The surgeon who is practically acquainted with the methods of puncturing the veins, should use the utpalapatra and vrihipatra knives for the purpose."²

When used for puncturing the large veins the knife is recommended to be encircled with thread at a short distance from the end to prevent unnecessary injury to the vessels by plunging the the knife deeply³.

Hippocrates similarly "guards his phlebotome in the surgical treatment of empyema, by having it wound round with a rag, leaving the breadth of the thumb nail at the point."⁴

Both the utpalapatra and vrihimukha knives are thus described in the Aśvavaidyaka⁵: The "vrihimukha knife should be six aṅguli long and half an aṅguli wide. The utpalapatra should also be similarly made."

The utpalapatra knife is recommended to be used for incising

¹ शब्दे शीतपलपत्रेण वैहिपत्रेण वा भिषक् ।

विराविधिं च सम्बृहट्कर्त्त्वं प्रयोजयेत् ॥

Aśvavaidyaka, XIV. v. 23.

² मृतकैष च संवेष्य सुखं शमनस्य वृहिमान् ।

यथाप्रभावे संस्थाप्य ततो विशावयेत् विरामः ॥

Ibid, XV. v. 35.

³ Hippocrates, II. 258 Kuhn's Ed. and I. 88 Syd. Soc. Ed.

⁴ अद्वौहृत्तु विक्षीणे कूर्यचक्षम् ।

नाथा वैहिसुखं सम्बृहट्कर्त्त्वं चोत्पलपत्रकम् ॥

Aśvavaidyaka, XIV. v. 21.

the abdominal parietis of the horse; then a tube is to be pushed through the wound in the operation of paracentesis abdominis¹.

The phlebotome used by the Greeks is nowhere described in their books; but from considerations of all the various operations to which the instrument was put bears out the fact of its being a sharp pointed, double-edged and straight lancet. The phlebotome of the Greeks might have then resembled in shape the utpalapatra of the Hindus. It was used by the Greeks for various operations besides phlebotomy, as for the opening of abscesses such as the parulis or gum boil², puncture of cavities containing fluid as in opening the abdomen for ascites³, incising the tunica vaginalis as in excision of hydrocele sac⁴ and for dissecting out warts⁵ and sebaceous cysts⁶.

It is interesting to note that Pālakāpya⁷ mentions utpalapatra and describes it to be eight aṅguli long, one and a half aṅguli broad and double edged. He uses it for puncturing vessels etc.

१ इदयमाधरे भागे कर्वभागे च नाभितः ।
अधीया नाभितः कुर्याद्देहं चतुरहृष्टिः ॥
श्लोकोत्पलपत्रं वासभागे दिवचयः ।
एकमेवाहृष्टं शस्त्रं कुचीचापि प्रवेशयेत् ॥
वेधत्रये तत्त्वचिन् नालिकां वस्त्रवेदिताम् ।
प्रचिप्य गालयेहारि यावहैकोठलाघवम् ॥

Aśvavaidyaka, LII. vs. 25, 26 and 27.

¹ Paul, VI. xxvii.

² Ibid, VI. L.

³ Ibid, VI. lxii.

⁴ Ibid, VI. lxxxviii.

⁵ Ibid, VI. xiv.

⁶ शौहिसुखप्रमाणसुपलपत्रं भेदनाद् ।

7. ARDDHADHĀRA.

It is difficult to ascertain the exact shape of this knife. Some translate it as a "single edged knife,"¹ but it really means, as Dallāṇa explains, an instrument which has a sharp edge for half the length². It is also called cakradhāra. Vāgbhaṭa has a variant reading—adhyārddhadhāra—which means an instrument having a sharp edge for more than half the length³.

It is eight aṅguli long; the blade is two aṅguli long and one aṅguli wide, and the handle six aṅguli long. It is to be used for incision and division of parts of the body.

8. SŪCI OR NEEDLES.

Three needles are recommended to be used for applying sutures. They should be strongly made and rounded in shape. At one end they are flattened, grooved and pierced with an eye for the suture. The groove is said to have been intended to be the bed of the suture during stitching to prevent it from doing any harm to the tissue. In fleshy parts such as the thighs, a three ribbed needle, three aṅguli long, is advised to be used. For less fleshy parts and wounds about the joints, a similar straight needle but two aṅguli long should be employed, while for suturing the wounds of the stomach, intestines, serotum and the vital parts of the body, preference is given to a needle curved like a bow, two and a half aṅguli long and having the pointed end

¹ Horrele's Translations of Saṅkuta Saṁhitā, Bibl. Ind. I. viii.

² अद्धधारनिति, अद्ध धारा वस्त्र तत् अद्धधार, चक्रधारनिति प्रसिद्ध तत् अद्धाहृतायत् चरसि अशुल विक्षार इहाहृताफलं । अन्ये त्रयीद्धधारनिति पठन्ति, अधिकमद्ध धारावस्त्र तत् अद्धधारम् ।

Nivandha Saṅgraha, I. viii.

³ See foot-note 5, P. 240.

shaped like a paddy. In thickness, these needles are described to be equal to the stalk of the flower of mālatī (*Jasminum grandiflorum*). They should have sharp fine points and good shape¹. The needles are also recommended to be used for extraction of foreign bodies from the soft structures and also for evacuating abscesses².

१ देशेऽप्यमासे सभीं च मूच्छे इत्ताङ्गुलहर्यः ।
आयता वर्णाङ्गुला चक्षा मांसले वापि पूजिता ॥
धनुर्वका हिता मन्त्रफलकोषोदरोपरि ।
इत्येतान्तिविधाः सूचीसीखाराः सुसमाहिताः ।
कारयेन्द्रालतीपुष्पवर्णाशयपरिमधुलाः ॥

Suśruta Saṃhitā, I. xxv.

इत्ताङ्गुल डडः पाणे विस्तः मूच्छोऽपि सौबने ॥
मांसलानां प्रदेशानां चक्षा वर्णाङ्गुलमायता ।
अत्पर्नसिलिं संक्षिक्ष ब्रह्मानां इत्ताङ्गुलायता ।
ब्रीहिवका धनुर्वका पक्षानाशयमन्त्रेषु ।
सा साहंदाङ्गुल सभीं इत्ताङ्गाशयतुरङ्गुला ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

• तिस्रणा सूचीना विषयविशेषे आकारसेदानाह मांसलानानिवादि 'मांसलाना' क्षम्ब-
दीनो शरीर प्रदेशानां सौबनाये सूची, 'लाजा' विकीर्णविभिटा तथा वर्णाङ्गुलमायता,
अहुस्तवद्वौधां कार्तव्या, अस्त्राम्बालत्व मध्यमाशसौव न तु सञ्चांचयवस्तु । मूच्छः सञ्च-
यवस्तु हि साधारणतो इत्ता कारलनिहृशादितिव्य । अस्त्रा अपि गृह डड़ पाणाले
सामान्योऽप्ता कवितमिव अत्पर्नसिलस्थान संक्षितानां, सम्प्रस्त्रि संक्षितानांस ब्रह्मानां
सौबने वर्णाङ्गुलायता, अङ्गुलिवय दीधां, सूचीकर्तव्या, पक्षाग्नये, आमाशये तथा 'मन्त्रेषु'
वक्षादित्य संक्षितानां ब्रह्मानां सौबने, ब्रीहि चक्षा, पाटलादि ब्रीहिवन्मुखा, 'धनुर्वका'
धनुर्वकाकारा या सूची साहंदाङ्गुला, 'साहंदाङ्गुलाधिक वर्णाङ्गुल दीधां योज्येति योजा' अत्यापि
गृह डड़ पाणाल्य 'योजनौय' । साहंदाङ्गुलिवनेन चेदः । सञ्चेयादि परेषा सम्प्रयते ॥

Vāgbhaṭāraṭa Kaumudi, I. xxvi.

* सूचीकृष्णवकाठीसुखमरारीसुखालसुखदिकृष्णकानि विसायये ।

Suśruta Saṃhitā, I. viii.

In modern times, the surgeons use fully curved, half-curved and straight surgical needles. Waring¹ remarks : "The shape of the needle which ought to be used for closing an incision depends upon the depth and accessibility of the wound. In deep wounds, or wounds which are not readily accessible, curved needles will be found to be most useful, while for shallow cuts straight needles will be most convenient."

Suśruta makes mention of a javamukhi needle² (*i.e.*, having the sharp end shaped like a barley corn) for passing a double ligature smeared with escharotic ointment, across the base of a tumour in opposite directions. Then by cutting through the nooses, and tying together the contiguous ends of the ligatures, the whole of the growth is encircled and strangled by them, exactly in the same way as in modern times a nævus is ligatured by means of a nævus needle. Cakradatta also quotes this description of the method of extirpating tumours by ligatures.

Erichsen says³ : " When the tumour is small, an ordinary double ligature may be passed across its base, by means of a common suture needle ; and the noose being cut and the thread tied on each side, strangulation will be effected. When it is of larger size, and of round shape, the most convenient method is that recommended by Liston. It consists in passing, by means

¹ Manual of Operative Surgery. By H. J. Waring, M.S., M.B., Third edition, P. 42.

² अर्जुदादिषु चोत्तिष्ठ मूले द्रवं निधापयेत् ।
मृचीभिर्वक्ताभिरचित् वा समक्तः ।
मूले द्रवेन वधीयाचिक्षेषे चापचरेत्वर्वन् ॥

Suśruta Saṃhitā, IV. xvii.

Cakradatta, Nādiṣvapacikitsā.

³ Erichsen's Surgery, Vol. II, P. 73.

of long noæus needles, fixed in wooden handles, and having their eyes near their points, double whipecord ligatures in opposite directions beneath the tumour; then cutting through the nooses, and tying together the contiguous ends of the ligatures until the whole of the growth is encircled and strangled by them."

There are many instances of the use of surgical needle by the Greek and Roman Surgeons. Needles of different sizes are recommended. Celsus mentions a large needle in describing the operation of suturing the abdominal parietis¹, and another, evidently a small needle, which is said to have been used in the treatment of staphyloma of the cornea². The needles were either round or three-cornered. "A few three-cornered needles of Roman origin have been found, although they are rare" (Milne³). Paul uses a needle in suture of the upper eyelid, and other modes of operating for trichiasis⁴, for the repair of wounds of the peritoneum⁵, and recommends a large sized needle containing a double thread to close the peritoneum in the operation for enterocèle⁶.

Pālakāpya mentions sūci or needles for stitching wounds⁷. They are eight aṅguli long, shaped like the tusk of an elephant and are either three ribbed, or four ribbed, or round, smooth and

¹ Celsus, VIII, xvi.

² Ibid, VII, vii.

³ Græco-Roman Surgical Instruments, P. 75.

⁴ Paulus Aegineta, VI, viii.

⁵ Ibid, VI, iii.

⁶ Ibid, VI, lxv.

⁷ मून्ही सेवनाय । चट्टाङ्गलं नागदन्ताङ्गति । चरका चतुरका वा इदा समाहिता यथा अलाका वसे चक्रविष्ट्वयम् ।

strong. He reserves curved three-cornered needles for fleshy parts and round needles for skin, veins, nerves and arteries¹.

Caraka recommends the use of leeches, knife and needles for extracting blood from the piles². He also advises us to use needles for pricking the patches of leprous spots³ before the application of leeches for extracting blood.

9. KUŠAPATRA.

It is a form of knife resembling in shape the leaf of a kuša grass (*Poa cynosuroides*)⁴. The instrument should be six aṅguli long (*Suśruta*) ; the blade measuring two aṅguli (*Vāgbhaṭa*)⁵

१ या: मृच्छिविधाः प्रोत्ता: शस्त्राभ्यामि संक्षिप्ताः ।
नागदन्ताकुशित्तिर्णा विकोषा चेति निव्यथात् ॥
अस्त्व्यादित् नागदन्तया मांसत्रं च विकोषया ।
त्वक्स्थायु धमनीभ्यः च विराजं चेव हतया ।
आहार्यं सर्ववल्लासाः सूक्ष्मा सौदर्मिष्टते ॥

Pālakāpya, III. i.

* अलीकोमि; तथा शस्त्रे; दूचोभिर्वा पुनः पुनः ।
क्षवद्दानं क्षपिर् रक्ताद्यैः प्रवाहयेत् ॥

Caraka Saṁhitā, VI. ix.

* प्रच्छितमत्त' कुठ' विरेचयेदा जलीकामिः ।

Ibid, VI. vii.

* कुशपत्रमिति, कुशपत्रतुल्य' कुशपत्रं तन्मानमाह :—
अहुलैक्षण्यं विद्यादहुलं फलसुचते ।
इत्त' सात् वाहुलं मध्ये कुशपत्रस्य लक्षणम् ॥

Nivandha Saṁgraha, I. viii.

* कुशाटी वदने द्याव्ये अपहुलसात्त्वयोः परम् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

कुशाटीवदने वे शस्त्रे, द्याव्ये दिक्षावच विषये योज्ये । तद्योः कुशाटी वदनयोः
फले वाहुलं, अहुलदद्य परिमितं सात् ।

Vāgbhaṭārtha Kaumudi, I. xxvi.

and the handle four aṅguli, but according to Bhoja, the handle is three aṅguli long. It is to be used for draining pus from abscess. The handle has a ring like ornamentation, about one aṅguli in diameter. Another variant reading describes the blade, the ring, and the handle to have the lengths of two, three, and two aṅguli respectively. This would make the total length of the instrument to be seven aṅguli; so evidently there is some lapsus calami in the second reading.

Cakradatta uses kuśapatra as a bleeding lanceet and says¹: "Out of the twelve vessels that lie on the sides and underneath the tongue, select the two large bluish vessels on either sides of the tongue, raise them up by vaḍīśa or hook and puncture them by the kuśapatra knife and then, after bleeding, apply a paste of treacle and ginger to the wound". In the Yogaratnākara², the author advises us to adopt this method of bleeding, in the treatment of tumours in the neck.

Pālakāpya mentions kuśapatra and describes it as being shaped like a kuśa grass³. It is nine aṅguli long—the handle being

¹ जिहावा: पार्श्वोऽधसां शिरा शादग कौति॒ता: ।

तासां स्फूर्तिरे कृचे चिक्षात् ते तु श्वेः श्वेः ॥

विशेषेव संग्रहा कुशपवेष तुष्टिमान् ॥

Cakradatta, Galaganya Cikitaś.

² जिहावः पार्श्वयोर्मुलाच्छिरा शादग कौति॒ता: ।

तासां स्फूर्ते शिरे च चिक्षात् च श्वेः श्वेः ॥

विशेषेव संग्रहा कुशपवेष तुष्टिमान् ॥

सुने रक्ते श्वेः तजिन् ददातसु गुणादकम् ॥

Yogaratnākara, P. 321.

³ नवाङ्गुले कुशपवे: पक्षाङ्गुले हत्ते: । चतुरङ्गुलम् पवे: । अध्याधांहुलविशृत-
सुभयतो धारे: । कुशपचालति यश्चोरपाकमेदनाथं यडङ्गुले हत्तम् अध्याधांहुलं पवे: ।

five or six aṅguli and the blade four aṅguli long. The blade is one and a half aṅguli wide and is sharp-edged on both sides (*i.e.*, double-edged). It is used for incising deep abscesses.

10. ĀTĪMUKHA.

This instrument is described to have the shape like the beak of the jalavardhanī bird or āṭī¹ (*Turdus ginginiamus*),—a bird living in the marshes. It is six aṅguli long; the blade measuring two and the handle four aṅguli. So it is of the same size as the kuśapatra to which it also resembles in function. Bhoja is of opinion that its blade is one and the handle seven aṅguli long.

11. ŚARĀRIMUKHA.

This instrument is a pair of scissors resembling the face of the long beaked bird called śarārī. Dallana describes two varieties of the bird, one with white shoulders, and the other with a red head. It is the former kind which is referred to here². Suśruta describes its length to be ten aṅguli³, while Dallana mentions the length to be twelve aṅguli.

¹ चाटीमुखमिति, चाटी जलवर्धनी नाम पचिविरेषः तमसुखवमुखं यस्य तत् चाटीमुखं लक्षयाचोत्तमः :—

इन्हे सनाइड्रुलं विद्यात् तस्याये फलमिथते।

चाटीमुखं प्रकारं हि फलमहूडमायतम्।

Nivandha Saṃgraha, I. viii.

² शरारीमुखमिति, दौधेच्छुः पचिविरेषः स हिविधः घवलक्ष्म्यः रक्तशीर्षयः घवलक्ष्म्यस्य शरारीति संद्वा तमसुखवमुखं तस्य शस्यसा खोके कर्तृरीति संद्वा ताव दादगाइला चलपत्तासां कुर्यात्।

Ibid.

³ दग्गाइला शरारीमुखी ना कर्तृरीति कर्यते।

Suśruta Saṃhitā, I. viii.

It is recommended to be used for evacuating abscess¹, etc. Suśruta mentions karttarī as a synonym but Vāgbhaṭa counts it as a separate instrument. He describes karttarī as a pair of scissors used by the barbers for clipping hair and is said to have been necessary for dividing the nerves, ligaments and fine hairs².

— 12. ANTARMUKHA.

Suśruta describes another variety of scissors, used principally for evacuating abscesses. It is so named, for its straight cutting edges are within its curved claws³. It is said to be six aṅguli long and one and a half aṅguli broad⁴. It seems that the curvature of the blade varied widely; and Vāgbhaṭa describes a variety called

¹ शावे शराव्यासाविकृचिंके ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

‘शावे विचावनविषये कम्भेणि शराव्यासा तिकृर्धके दे शस्त्रे योज्यः । तत्र शराव्यासा शरारीमुखं शरारी दीर्घं चतुः पवित्रिग्रेषः तसा सुखवदासं वस्त्रं तत् शराव्यासां, तत्र चलत् फलं दशाहृतं दोषं कायं ।’

Vāgbhaṭārtha Kaumūḍī, I. xxvi.

² शायु मृद्ध कचक्षेदे कर्त्तरी कर्त्तरीनिभा ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

‘कर्त्तरीशक्तमाह शायुव्यादि कर्त्तरीनामशक्तं कर्त्तरीसद्बं तत्र शायुच्छेदने मृद्धकेग-
च्छेदने च योज्यः । कर्त्तरी काटारी इति यस्म प्रचिह्निः ।’

Vāgbhaṭārtha Kaumūḍī, I. xxvi.

³ अन्तर्मुखमिति मध्यमुखं तह्वचमाह—

‘चटाहृतप्रमाणेन जिङ्गवारेण चाप्तुम् ।

शक्तमन्तर्मुखं नाम चन्द्राहृतं द्रव चोहसं ।

Nivandha Saṃgraha, I. viii.

⁴ तह्वदन्तमुखं तस्म फलमध्यैमहृत्ये ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

arddhacandrānan¹ or “half-moon faced” scissors in which the blades are curved like the half-moon. It has the length of eight aṅguli, the blade measuring one and a half aṅguli. This is also to be used for letting out pus from abscesses.

Hārīta, however, mentions a ſaſtra, called also arddhaandra or half-moon, but he recommends its use for excising the prolapsed arms of a dead fœtus to effect its delivery². This instrument can not but be a knife, for it seems difficult to cut off the arm, even of a fœtus, with a pair of scissors. Moreover, antarmukha has never been credited with the power of excising the arm.

13. TRIKŪCCAKA.

It has been translated in English as a thin-edged sharp instrument or trocar. Wise, Dutt and Hoernle agree to mean by it a trocar. But it can be better explained if we understand by the term an instrument consisting of three needles fixed on a round

अपरत् विकावच मन्त्रमाह तद्दिवादि तदृत् कुशाटीबदनवत् अन्मुखं अन्मुखं नाम
चक्रं सावे योग्यं तस्य अन्मुखसकलं अध्यैमहूलं सात् । आपि अधिकं अहं अध्यहं ।
साहौकमहूलनिवर्यः ।

Vāgbhaṭārtha Kaumūdi, I. xxvi.

¹ अहं चन्द्राननं चैत तदाध्याहूलं फले ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

अन्मुखस्य प्रकारभेदमाह अहंचन्द्रानननिवादि एतत् अन्मुखं, अहंचन्द्राननं अहं-
चन्द्राकारमुखच भवति, तदपि तदृत्, कुशाटीबदनवत् सावे योग्यः । तस्य फले अहौहूलं
सहौहूलपरिमाणं कलनिवर्यः । अहंचन्द्राकारमुखलात् तस्य शक्तस्यापि अहंचन्द्रानननिवि-
संज्ञेति वीथे ।

Vāgbhaṭārtha Kaumūdi, I. xxvi.

² अयवाहंचन्द्रेण शस्त्रे हैव सतगम्भेष्व बाह्युमले सञ्चिद्य वाहनिसारथेत् ।

Hārīta Saṃhitā, III, li.

wooden handle¹. According to Suśrata, the length of the instrument is six aṅguli. But others describe it as eight aṅguli long, the blade and the handle measuring three and five aṅguli respectively². The distance between the edges is the breadth of a grain of rice. The end of the handle is ornamented with a circular metallic plate as a ring.

It is recommended to be used for evacuating abscesses and for draining blood from the nasal polypus.

Caraka³ mentions an instrument called kūrcea and says:— “After fomenting and thus softening the rounded nodules (of leprosy) which are fixed and hard, by heated stones and fumigations through tubes, they are to be injured by the kūrcea and the blood that oozes out, should be wiped away.”

Two other instruments are described by Vāgbhaṭa as being constructed on a similar principle. One is named kūrcea and the

¹ विकृदकमिति वयः कुचां यस्य तत् विकृदकम् । कृष्णः नृं चौ इति लोके ।
Vāgbhaṭārtha Kaumūḍī, I. xxvi.

² विकृदकमिति वयः कुचां यस्य तत् विकृदकम् तत्र सन्धानरम् :—

अङ्गुलानि तथादी च शस्त्रं कायं विकृदकं ।
फलेरभ्युखाकारेव अङ्गुलेभितं विभिः ।
एकेकस्य फलभेदामनारं ब्रौहिमधितम् ।
इन्नं पचाङ्गुलायामे कायं कृचकभूषितम् ॥

Nivandha Saṭhgraha, I. viii.

³ स्थिरकृतिनमस्यानां स्थिरानां प्रस्तरप्रसादीभिः ।
कृद्विर्विष्टिसानां रक्ताग्नके शोऽपनेतयः ॥

other, khaja. The kūreca¹, he describes as an instrument "consisting of seven or eight rounded sharp needles, four aṅguli long, nicely bound together by a cord and tightly fixed on a circular wooden handle." He mentions its use in the operation of scratching to cure baldness and the brown and black spots on the face. For scarifying a bald spot, Cakradatta² uses needles, rough leaves, etc. "The khaja³," Vāgbhaṭa continues, "consists of eight rounded needles having the sharp ends half an aṅguli long. It is to be introduced

^१ कूर्दीकृते क पीठस्थाः सप्तादी वा सुवस्थनाः ।

संयोज्य नीलिका व्यङ्ग केश शारेषु कुहने ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

सम्भवति कूर्दीकृते गम्भे लब्धितुमाह सर्वेवादि ता; सूचः सर्वएव डृशा; वर्तुलः तथा चतुरडुलः चतुरडुलदीर्घाः कूचः इत्युच्चने । ता; सूचः पुनः कौदिग्रा; ? डृतेकपीठस्थाः डृते वर्तुले एकधिन् पृष्ठे संचिताः, एकं हलाकारं काषाफलकं परिवेष्य स्थिता इत्यर्थः । तथा सहसंख्यका अटसंख्यका वा, तथा गोभनं रञ्जादित्तं वस्त्रं यासा ताक्षाद्यविधाः सुवस्थनाः । स कूचः नीलिकादिषु रोगेषु कुहने कुहार्दे संयोज्यः प्रयोज्य इत्यर्थः । कुहने खाच्छान इति लोके । नीलिकादियो वल्यमाणा केशातः किञ्चानां पतने ।

Vāgbhaṭārtha Kaumūḍī, I. xxvi.

^२ अवगाढपदचैव पुच्छयित्वा पुनः पुनः ।

Cakradatta, Kṣudrarooga Cikitsā.

अवगाढपदमिति गच्छीरपदं यथास्थात् तथा: मूच्चीनस्त्ररञ्जन्यादिभिः पुच्छयित्वा * * *

Tattva Candrikā, ibid.

^३ अदाङ्गुलसंस्थो डं चेरटाभिः कटकैः स्त्रजः ।

पाणिभ्याः सर्वमालेन प्राणालेन हरेदस्त्रक् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

खजसंज्ञकशस्त्रमाह अदाङ्गुलसुखेरिवादि अदाङ्गुलप्रमाणं सुख येषां ते अदाङ्गुलसुखां लोपद्वाङ्गुलसुखेः हन्तः वर्तुलैः अदाभिः अटसंख्यकैः कटकैः हते गम्भे खज उच्चते । तेन खजालेन शस्त्रेन पाणिभ्याः इकाम्बा सर्वमालेन वालोद्यमालिन प्राणात् नासिकादा, अस्त्रकूले हरेत्, निर्वेदित्यर्थः ।

Vāgbhaṭārtha Kaumūḍī, I. xxvi.

into the nostrils and turned to and fro with both hands to bleed the nasal polypi."

The Greeks and Romans used a similar instrument for identical purpose. It was called katiádion, measuring a blade of grass, and was used for opening abscesses of the womb and tonsils, drawing blood from the inside of the nose and perforating the fetal cranium.

In India, the practice of drawing blood from the nasal polypus by blades of grass is still in vogue; and Aretens mentions it as a common mode of scarification in ancient Greece also¹. "On the next day we are to abstract blood from the inside of the nostrils, and for this purpose push into them the long instrument named Katiádion, or the one named Toryne, or in want of these we must take the thick quill of a goose, and having scraped the nervous part of it into teeth like a saw, we are to push it down the nostrils as far as the ethmoid cells, then shake it with both hands, so that the part may be scarified by its teeth. Thus we shall have a ready and copious flow of blood; for slender veins terminate there and the parts are soft and easily cut. The common people have many modes of scarification, by rougher herbs and dried leaves of the bay, which they introduce with the fingers and move strongly." Paul² opens the vessels in the nostrils with the reed called typha.

14. KUTHĀRIKĀ.

It is a small instrument shaped like an axe, so called from its resemblance to kuthāra, an axe which is still used in India

¹ Extant works of Aretaeus, P. 400.

² Paul, vol. II. Sec. lx.

for cutting wood¹. Vāgbhaṭa says² that "the base of the blade is thicker and broader than the end and is fitted to a handle, seven and a half aṅguli long. The blade which is shaped like the tooth of a cow, has the width of one aṅguli." Bhoja describes the width of the blade to be a half aṅguli³. It is recommended to be used for puncturing vessels in the following manner⁴:—"Hold the handle with the left hand and put the blade on the vessel resting on a bone. Raise the instrument a little upwards and then strike over the thick base of the blade with the downward strokes of the middle or index finger, when let go

¹ For figure of Kuṭhāra as used in Ancient India, see Pl. xxii in Ferguson's Tree and Serpent Worship.

² एषुः कुटारी गोदनसङ्घर्षादाङ्गुलानना ।

तवोर्ध्वदक्षया विषेदुपव्यस्थूः सिरो लिप्तो ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

कुटारिका मंजकं शम्भाह पथरित्वादि कुटारी एषुः स्थान । कुटारिका नामग्रन्थं एषुः
च्छुलस्तं सादित्यव्यः । तथा गोदनसङ्घर्षादाङ्गुलानना गदा दन्तः गोदन सङ्घर्षं तुल्याकारं
अहाङ्गुलायते चानने मुखं वस्त्राः सा तथा विवया तथा कुटार्यो जर्ददक्षया अस्युः
उपरिलिप्तो सिरो विषेत् । तद्दण्डं वामहसेनोद्दीक्षय कुटार्यामुखं शिरोपरि मंसाप्य
दक्षिणाङ्गुहतन्त्रेनीभ्यो कुटारिकामस्तकमनिष्ठ्य शिरो विषेत् ।

Vāgbhaṭārtha Kaumūḍī, I. xxvi.

³ कुटारिकेति कुटारतुल्या कुटारिकाः—

कुटारिकाया हनं स्थानं साहंसमाङ्गुलायते ।

फलमहाङ्गुलायाम् गोदनसङ्घर्षं समन् ॥

Nivandha Saṃgraha, I. viii.

⁴ तथा मध्यमयाङ्गुला देयोऽङ्गुष्ठ विसुक्षया ।

ताङ्गेयदत्तितां चाला म्यगादिवाङ्गुष्ठ पीडनैः ॥

कुटार्यो लक्ष्येन्द्रिये वामहस्तं महीतया ।

फलोद्देशं सुनिष्कर्य शिरो तदवृत्तं मीचयेत् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvii.

forcibly from the under surface of the thumb". Cakradatta¹ also advises us to use it in a similar manner. To open the veins in fleshy parts, Vāgbhaṭa recommends the vṛihimukha knife, while the kuṭhārīkā is advised to be used in venesection on bony structures.²

Pālakāpya³ mentions the kuṭhāra and describes its shape to be like an axe. It is to be used for excision and scarification. He describes another śastra called vatsadanta (*i.e.*, the calf's tooth); it is ten aṅguli long; and the mouth of the instrument is one and a half aṅguli broad. It is also to be used for excision.

"Bleeding from the jugular vein, he (Albucasis) describes much in the same way that it is now practised by veterinary surgeons, namely, by placing a sort of scalpel bent at the point, which he calls fissorium, upon the vein, and striking the instrument with a hammer or some such body. He gives drawings of variously shaped lancets for opening the veins of the arm."⁴

"Ferriers bleed with a fleam, which, though apparently a clumsy method of operating, is certainly safer than the lancet in

¹ वास्तविकं विनाशय कुटारीमितरेण तु ।
ताङ्गदिव्यमाङ्गुल्याङ्गुलिदिव्यमस्त्रया ॥

Cakradatta Śīrvyādhādhikāra,

² मांसले निचिपेहे शे बीहामि बीहिमावकम् ।
यवाईमस्युम्परि गिरो विष्वन् कुटारिकाम् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvii.

³ कुटाराकृति कुर्यात् । कुटारी गच्छपत्तेदनाद॑ । वक्षदलाकृति वक्षदलं दशाङ्गुलम् ।
एकोक्तम्युर्हिलस्त्वम् । एवमेतानि च तौष्णिपि यथाधीनं प्रकृद्वाय॑ ।

* * * * *

कुटाराकृतिगच्छेण ततस्ते प्रकृद्येदिष्वक् ।
नातिगाढं न च लक्ष्यं न घनं विरलं न च ॥

Pālakāpya, III. iii.

¹ Albucasis Chirurg. ii. 97; also see Adam's Commentary on Paul, VI. ix. 323.

unknown hands." "In bleeding with a fleam, the near side is most convenient. In skilful hands, there is no occasion for a blood stick, as the fleam may be struck with the right hand if it is made broad and round at the back. It also may be made much smaller and neater than that generally employed". There is a drawing of such an improved fleam which much resembles in appearance the kūthārī of the Hindus. "A fleam is rather more convenient instrument in bleeding, either from the arm or thigh, as the vein is somewhat apt to roll when a lancet is used."¹

15. VRĪHMUKHA.

It is described as a kind of trocar², the sharp end being pointed and shaped like a grain of paddy. It is six aṅguli long, the handle being two and the blade four aṅguli (Bhoja). But Vāgbhāṭa³ describes the length of the blade to be one and a half aṅguli.

It is advised to be used for paracentesis abdominis in abdominal dropsy. Suśruta says :⁴ "The friends of the patient should

¹ White's Compendium of the Veterinary Art, 1851, 18th ed. P. 342.

² व्रीहिमुखनिति व्रीहिमुखनिव मुखमस्त व्रीहिमुखं तत्र भोजः—
व्रीहिमुखं कार्यमहुलानि पदावतम् ।
याहुलं तस्य हन् सात् तत्फलं चतुरहुलम् ।
तमुखं व्रीहिविकारं तनुर्मूदकपृष्ठकम् ॥

Nivandha Sañgraha, I. viii.

³ * * * * तथाध्यवाङ्मुखं फले ।

व्रीहिविकारं * * * * Asṭāṅga Hṛiday Sañhitā, I. xxvi.

⁴ उदकोदरिचन्द्रं वातहरतैलाभ्यक्षेषाणीदक्षिण्डस्य चिकित्सापातः सुपरिचयहीतस्याकचान्-
परिवेटितस्यापाती नाभेच्चामतवत्तुरडुलमपहाव शेषराजा व्रीहिमुखेनाङ्गोदर प्रभाशमक्षाद्ये
विष्वेत् ।

Suśruti Sañhitā, IV. xiv.

hold him under the axilla. Then the abdomen is to be tapped by the vrīhimukha knife at a point, four aṅguli distant on the left side from the median line, underneath the navel." Vāgbhaṭa¹ advises us to surround a broad bandage round the abdomen before tapping it by the instrument, which he recommends to be introduced up to one aṅguli. Cakradatta² refers to works on surgery for the surgical treatment of ascites. A small incision is directed to be made before the puncture.

In the Aśvavaidyaka, for this operation, the utpalapatra knife is recommended; an incision four aṅguli long is directed to be made above or below the navel of the horse, and then the end of the knife is to be plunged into the abdominal cavity up to one aṅguli.³ The vrīhimukha is also advised to be similarly used.⁴

Hippocrates speaks of evacuating the fluid in paracentesis abdominis with an instrument which Camper thinks must have been a kind of trocar.⁵

सजले जठरे तैलेरभ्यत्तानिलापहि ।
स्त्रियोऽनुवा कल्पनुदरे परिवेदिते ॥
वहकिदीदितोऽस्याने विधे दहुलमाचकम् ।
निधाय तच्चिन्द्राढीय सावदेहमन्धसः ॥
अथास्य नाडीमाकाश तैलेन लवणेन च ।
प्रथमभव्य वहा च वेटयेह वाससीदरम् ॥

Aṣṭāṅga Hṛdaya Saṃhitā, IV. xv.

* आते आते जले साथे जाफोक्तं ग्रस्तकर्णे च ।

Cakradatta, Udarcikitsā.

¹ See foot-note, l. p. 242.

² See foot-note, 4. p. 241.

³ See the Commentary on Paul. By Adams, vol. II, P. 238.

It is also to be used for puncturing the vessels in phlebotomy (*Vāgbhaṭa*)¹ especially in the fleshy parts of the body.² Cakradatta uses *vrihimukha* in phlebotomy and says : "The sharp end of the *vrihimukha* should be kept under the palm between the thumb and index finger and is to be thrust into the seat of puncture."³

Suśruta directs us to use it in tapping the hydrocele:⁴ "Then the hydrocele is to be wrapped round with a bandage. The fluid is next to be drained by tapping it with a *vrihimukha* on the lower part of the scrotum, little externally to the suture." Similar directions are given in the *Yogratnākara*.⁵ Cakradatta also gives a similar discription.⁶

¹ ब्रौहिकल्प प्रयोज्यत्वं तत्सिरोदरयोर्विषेः ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

ब्रौहिमुखाद्य शस्त्रं चाह ब्रौहिकल्पित्वादि ब्रौहिकल्पित्वादि वक्त्वा वस्त्रं तत् ब्रौहिकल्पे ब्रौहिमुखः यत्तशस्त्रं तत्सिरानि व्यवे ल्पयन्ते सथा उदरसा अलोदरसा व्यवे साववाद्य योज्यः ।

Vāgbhaṭārtha Kaumudi, IV, xxvi.

ताङ्गयन् पीडयेनो विष्टो द ब्रौहिमुखेन तु ।

Aṣṭāṅga, Hṛdaya Saṃhitā, I. xxvii.

² माससि निःविष्टो ह प्रे ब्रौहास्य ब्रौहिमाचकम् ।

Ibid.

माससिववकाशेषु यवमांचे शस्त्रं निदध्यादतोहन्तेभ्यवमाते ब्रौहिमात् च ब्रौहिमुखेन ।

Suśruti Saṃhitā, IV. viii.

³ ततो ब्रौहिमुखः व्यधापदेशे नाश्य पीडयेत् ।

अङ्गुष्ठतर्जुनीभस्तु तलप्रकादित् भिषक् ॥

Cakradatta Śīravyādhādhikāra.

⁴ See foot note 5, P. 123.

⁵ संस्त्रेय मूत्रप्रभवं वस्त्रस्त्र्येन विटयेत् ।

सौवन्ना पार्वतोऽधस्ताविष्टो ब्रौहिमुखेण वै ॥

Yogaratnākara.

⁶ संस्त्रेय मूत्रप्रभवां वस्त्रपदेन विटयेत् ।

सौवन्ना पार्वतोऽधस्ताविष्टा ब्रौहिमुखेण वै ॥

Chakradatta Vjñāhi Cikitaś.

Paul describes the operation but he recommends a sharp-pointed knife or lancet instead of a trocar. He says: "Wherefore we must make the patient stand erect; or if this can not be done, we must cause him to be seated; * * *. We give orders to the assistants standing behind to press with their hands and push downwards the swelling to the pubes. Then taking a sharp-pointed knife or lancet, if dropsy be among the intestines, in the perpendicular line of the navel, and about three fingers' breadth distance from it we divide the hypogastrium as far as the peritoneum."¹ Celsus mentions that some perform it at a spot four fingers' breadth below the navel in the left side, and recommends us to use a perforator, the point of which should be about the size of the third part of a fingers' breadth.² Vegetius, the veterinary surgeon, recommends paracentesis for the dropsy of cattle.³ The Arabic authors Avicenna,⁴ Serapion,⁵ Albucasis,⁶ Haly Abbas,⁷ and Rhases,⁸ give similar descriptions.

In modern times, we perform the operation in the same way. "It is necessary in certain conditions to tap the abdomen in order to withdraw fluid which has accumulated there and this is usually done by means of a special trocar and canula. The site for tapping is selected, the usual spot being in the middle line, half-way between the umbilicus and the pubes. A

¹ Paulus Aegineta, Bk. VI, I. Syd. Soc. Ed.

² Celsus. vii. 15; ii. 10.

³ Vegetius. Mulum. iii. 25.

⁴ Avicenna, iii. 14; iv. 13.

⁵ Serapion. iv. 7.

⁶ Albucasis: Chirrag. ii. 54.

⁷ Haly Abbas, Pract. ix. 41.

⁸ Rhases, Cont. xix.

small puncture about one-third of an inch long is made with the knife at the spot selected. The trocar and canula to which the rubber tubing is attached, are then thrust through the abdominal wall into the peritoneal cavity."¹

The Greeks did not describe the operation of tapping the hydrocele. They always preferred the open incision to puncture. Paul uses a knife for making the skin incision, but when the tunica vaginalis is laid bare, he divides it through the middle with a lancet for bleeding.² Some of the Arab authors mention the operation of puncturing the scrotum for hydrocele. If the patient be timid, and do not choose to submit to open incisions, Albucasis advises the surgeon to let out the water either with a scalpel or the instrument used for tapping in dropsy. He states, however, that the water will collect again after this operation.³ Rhases also describes this operation.⁴

In modern times, trapping for hydrocele is still practised. "When trapping a hydrocele the patient should be sitting up in a chair * * *. The scrotum, having been cleansed, is grasped from behind by the left hand * * *. A spot, free from any large veins, is selected on the anterior and lower part of the swelling, and the trocar and canula introduced with sharp stabbing movement."⁵

Pālakāpya⁶ describes vrihimukha as shaped like a grain of paddy and recommends it for scission and excision of muñja.

¹ Operations of General Practice. By Corner and Pinches. P. 100, 2nd ed.

² Paulus Ægineta, VI. lxii.

³ Albucasis. Chrug. ii. 62.

⁴ Rhases. Cont. xxiv.

⁵ Operations of General Practice, P. 145.

⁶ खेला पाटन चैव कुप्योऽस्मिन्दुष्टेण तु।

16. ĀRĀ OR AWL.

It is a long sharp needle in handle, so called from its resemblance to the shoe-maker's instrument known as awl. "It has a total length of sixteen aṅguli, with a sharp end of the size of a sesamum seed. The handle is tapering like a cow's tail and is equal in circumference to the young stem of Dūrvā (Unodon Dactylon)" (Bhoja)¹. Suśruta mentions its length to be six aṅguli. Vāgbhaṭa describes the length to be one aṅguli, the basal half being round, and the terminal half, four cornered and sharp pointed. The terminal part is introduced into the inflammatory swellings to confirm the diagnosis of suppuration. It is also to be used to drain the congested blood vessels in the matrix of the nails as a result of traumatism².

१ अरिति, आरिव आरा असि: कर्णकाराणां शस्त्रं । तव सन्दानरम्:—

आरा इट्टाङ्गुलयामा कर्त्तव्या तु विशाप्तेन ।

तिलप्रभावान्तु फलं तस्मा; काये समाहितं ।

दुर्बाङ्गुरपरीणाहं इत्तु गोपुच्छसत्रिमं ।

Nivandha Saṅgraha, I. viii,

२ अधने कर्णपालीना युषिका मुकुलानना ।

आराऽङ्गुलहत्तास्ता तत्प्रविष्ठो तथोऽहृतः ॥

चतुरसा तदा विषेच्छोच्चं पद्माम संशये ।

कर्णपालीन वहला वहलाया न च शस्त्रेन ॥

सूचा विभागश्चिरा वर्जुला कर्णवेधनो ।

Aṣṭāṅga Hṛidya Saṅhitā, I. xxvi,

सम्पति कर्णपालि अधने योग्यानि शस्त्राणि वज्रमाह अधने इत्यादि कर्णपालीना कर्णलताना अधने अधनविषये युषिका युषिका नाम शस्त्रं योज्यं । कौहशी? मुकुलानना सुकुलवत् प्रकृतलाल युषिका मुकुलवत् आनन् सुखं यस्मा; सा तथाविधा । अरिवादि अर्हाङ्गुलं परिमानं इत्तु वल्लुलं आसे मुखं यस्मा; सा तदा अर्हाङ्गुलहत्तासा, तथा स एव अर्हाङ्गुलप्रभाषः प्रवेशः प्रवेशः यस्मा; सा तथाविधा तत् प्रवेशा तथा कहृतः हन्ताङ्गुलादुपरिदात् तथा अर्हाङ्गुलं परिमाणैव चतुरसा चतुर्षोका सा आरा कर्णते ।

It is also said to have been used for perforating a thick lobule of the ear, though for this purpose another instrument called *karna-vejhani* or ear-perforator—a needle specially meant for perforating the lobules of the ears,—is mentioned. It is three aṅguli long, having a slit or eye in the three-fourths of its length. The barbers used a similar needle to perforate the ears on the ceremony of tonsure.

For piercing the lobule of the ear, another instrument is mentioned. It is called *jūthikā*, from its end resembling in shape the conical bud of *jūthikā* flower (*Jasminum Auriculatum*).

Suśruta uses ārū or pāṇimantha to perforate the bone in diseases of the medullary canal caused by the obstructed and deranged air¹. He next introduces one end of a tube open at

एतेन आराया; फलं एकाङ्गुष्ठपरिभितमिति फलति तत्र प्रथमाहाङ्गुष्ठं इत्यंपराहाङ्गुष्ठं चतुराङ्गुष्ठं तयोरभयभागयोर्मध्ये अवश्यवतुरसी भागः प्रवैश्योग्य इति सूचितं। तया आराया पक्षाम संशये चयं शोदः पक्ष आमोचिति संशये सति ताङ्गुष्ठं शोद्य विषेऽन्, तया चहलां अतिमांसला कर्णपालोच तया विषेऽदिति योज्ञः। वहलामित्यनेन च्छेदः। वहलाया-मित्यादि वहलाया: अतिमांसलाया: कर्णपाल्या: अधने कर्णवेधनो नाम्यौ सूची च शस्त्रते। कौदृशी? विभागश्चिरा, विभागः शूद्धिर् शूद्ध्यं यस्या: सा तथाचिदा विभागश्चिरा तया वाहाङ्गुष्ठा अङ्गुष्ठवदीर्घाः। न किवलभागा वहलाया: कर्णपाल्या अधने शस्त्रते अपि तु कर्णवेधनो नाम्यौ सूची च शस्त्रते इत्यर्थः। कर्णवेधनों सूचीं अचादीशीया नरसुन्दरा कर्णवेधनाय अवहलन्ति। अतोऽपि वाहाङ्गुष्ठवर्णयेति।

Vāgbhaṭārtha Kaumūḍī, I. xxvi.

¹ निहत्तेऽस्तनि वा वायी पाणिमनेन दारिते।

नाडीं दत्तास्तनि भिषक् त्रुपवेत् पवनंवली॥

Suśruta Samhitā, IV. iv.

निहत्ते इत्यादि। त्वक्मासे शस्त्रेण विपाक्य अस्ति पाणिमनेन अराजकेण विहा तत्र रथे दिसुम्हीं नाडीं प्रणिधाय मुखमाहते चूपवेत् लवनापकर्षणे कर्णवीयमिति।

Nivandha Saṅgraha, IV. iv.

both ends into the canal through the hole in the bone, while through the other end the surgeon sucks out the air by his mouth.

For perforating the ears of the elephants, a similar needle is recommended by Pālakāpya. It is known as karmāra or nāli.

17. VETASAPATRAKA.

It is a long sharp cutting instrument shaped like the leaf of the rattan (Calamus Rotang). Its edge is finely serrated and very sharp. The blade and handle are equal in length, measuring four aṅguli. Bhoja says: "The blade is one aṅguli wide"¹. It is said to have been used for puncturing vessels in phlebotomy².

18. VĀPIŚA OR SHARP HOOK.

In shape it is described to resemble the ordinary fish-hook. Bhoja describes the total length to be six aṅguli, its hook being half an aṅguli and its handle five and a half aṅguli long. The end is bent; the curvature varies and may be shaped like a half-moon³.

¹ वैतसपवमिति, वैतसपवमिव वैतसपवमत्वं भोजः—

तीक्ष्णमहुत्वं विस्तारं चतुरद्वयायते ।

चहुत्वानि तु चत्वारि इन्द्रा' कार्ये' विज्ञानताः ॥

Nivandha Saṅgraha, I. viii.

² वैतस' अधने ।

Aṣṭāṅga Hṛdaya Saṅhitā, I. xxvi.

वैतसपवादि शब्दाहृ वैतसमिलादि वैतस' वैतसपव' नामशब्दं सिरादीना अधन कर्त्त्वा वीज्ञये । वैतसपहुत्वान्तरलापस्य वैतस' वैतसपव' वैति संज्ञा ।

Vāgbhaṭṭartha Kaumūḍī, I. xxvi.

³ वडिग्निति वडिग्नतुल्यं वडिग्नं मनसावेष्टनीमाहः । तत्र सन्नान्तरे ।

वडिग्ने चापि कल्पये प्रभास्ये तु पहुत्वे ।

स्वानन्दन् सर्वोरिकमेवं नाम्यायतं भवेत् ।

Suśruta says¹: The end of the hook is sharply edged and is said to have resembled the new leaf of Java (Hordeum vulgare).

It is recommended by Suśruta² to be used for extraction of foreign bodies, e.g., the extraction of stone from the urethra. Its use is also mentioned for transfixing the membranous expansion in the operation for pterygium³ and for fixing and dragging the uvula and tonsil before the performance of any operation on these parts⁴. Cakradatta⁵ mentions its use for fixing a growth, before its excision by the knife.

अर्द्धापचाहु ल' डन्ते शेषं कार्यं सुखं तयोः ।
चतुर्चन्द्राकृति वक्तं कार्यं नालानतस्य तु ।
लानतं नामयेत् तत वडिगच्छभिषमवरः ।
डन्ताययोरन्तरं सपाह यावदर्द्धाङ्गुलं भत् ।

Nivandha Saṅgraha, I. viii.

¹ वडिगोदनशङ्कुचानतां तीक्ष्णकचटुक प्रदमयवपत्तुये ।

Suśruta Saṅhitā, I. viii.

² यह चक्रया वा मुचमार्गप्रतिपद्माननारासतो यक्षामरी शक्तरा वा शोतसा अपहरेत् एवं चागके विदार्य वा नाड़े गम्भीर वडिगेनोद्देते ।

Suśruta Saṅhitā, IV. vii.

³ यह गोदग्निकाम्बादैर्वडिगः सुनताननः ॥

Aṣṭāṅga Hṛdaya Saṅhitā, I. xxvi

वडिगशस्त्रमाह यहमि इत्यादि सुनु भत् अङ्गवत् नमकृतं आननं सुखं यस्य स तथाविक्रियः सुनताननः वडिगं मत्स्वरेधनवत् वडिगेनाम शक्तं साज्ञः । स च गुणिकाम्बादैर्वडिगे योजये । आदिपदेश उपजिहिकादैर्य परिचयः ।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

⁴ पिङ्कासुतमाल्याच वडिगेनोदुर्वडिपक् ।
उदृत्य नपुसंयुक्तौ कषायैरवचूर्णयेत् ॥

Suśruta Saṅhitā, IV. xxi.

⁵ उत्तमाल्यानुपिङ्कां संकिट्य वडिगीडृताम् ।

Cakradatta, Śukrandoṣa Cikitsā.

It was also used for fixing any growth in the eye, previous to its excision by the *maṇḍalāgra*¹. For this purpose the Greeks used the *vulsellum* (*myzon*). Actius says: "If there is a large and malignant excrecence in the angle of the orbit, the enlarged part must be seized with *vulsella* and cut off."²

Evidently *vadiṣa* was used on many occasions when in modern times we use the dissection forceps to steady a part before excision.

Vadiṣa is described in the *Aśvavaidyaka*³ to have been similarly used during the operation of pterygium in horses.

*Palakāpya*⁴ mentions *vadiṣa* which is described as eight *nuguli* long, the end being rounded like a wheel. It is to be used for raising the membranes of the eye globe.

Sharp hooks were used by the Greeks and Romans, for similar purposes. The use of the sharp hook for fixing the pterygium is mentioned by Celsus⁵, Actius⁶, Paul⁷ and Albucasis⁸.

Its use in the excision of the tonsil is mentioned by Paul⁹. After the patient being placed in the proper position, he narrates: "We take a hook (tenaculum) and perforate the

¹ See foot notes 1, 2 and 3, I, 227.

² Actius, vi, 74.

³ विती नियाच्य तुरमं ततोनेत् प्रसारयेत् ।

कृतकर्णा भिष्मविदान् वडिशेनाचिकार्प्ति ॥

Aśvavaidyaka, XXX, v, 32.

⁴ वडिसं अकाशमटाइलप्रमाणमवोः पटलोहरनार्थं चेति ।

Palakāpya, III, xxx.

⁵ Celsus, VII, vii.

⁶ Actius, Tet. ii, iii, 62.

⁷ Paul, VI, xxiii.

⁸ Albucasis, Chirurg. II, 16.

⁹ Paul, VI, xxx.

tonsil with it, and drag it outwards as much as we can without drawing its membranes along with it, and then we cut it out by the root with the sealpel suited to the hand, called ancylotomus, for there are two such instruments, having opposite characters".

19. DANTA ŚĀNKU OR TOOTH-SCALER.

Its head is half an aṅguli long. It is quadrangular in shape and has a sharp edge. Suśrata¹ describes the end as slightly bent, sharp and shaped like the fresh leaf of Java. Bhoja² describes the end to be like that of the vrīhimukha.

Vāgbhaṭa³ describes a similar instrument called dantalekhana or tooth-scaler. It is also quadrangular in shape, one side being sharp-edged and the opposite side little lengthened. It is

¹ See foot note 1, P. 265.

² एवं हि क्रियने एती दग्धमसुविजानता ।

शङ्खं वज्रं मुखं तस्य कार्यमहोऽनुवायतम् ॥

चतुरक्षं समवेक्षं तीक्ष्णधारं समाहितं ।

इत्याद्यं तस्य कर्तव्यं शस्त्रं वैहिसुखाङ्गिः ।

कपालिकां शक्तरात्मा दन्तलेखनं शोधयेत् ॥

Nivandha Saṅgraha, I. viii.

³ एकधारं चतुर्भौषणं प्रद्वाङ्गति चैकतः ।

दन्तलेखनं कं तेजं शोधयेद्दन्तशक्तरात्मा ॥

Aṣṭāṅga Hṛdaya Saṅhitā, I. xxvi.

दन्तलेखनं शस्त्रमाह एक धारमिद्यादि एका वारा यस्य तत् एकधारं चतुरामः कीचा यस्य तत् चतुर्भौषणं कीचः कीचा इति यस्य प्रसिद्धिः तथा एकतः एकदिवात् प्रद्वाङ्गति चैकतः आकारो वस्तु तत्याविधिं प्रद्वाङ्गति दन्तलेखनं दन्तलेखनात्मा शस्त्रं सगाः तेजः दन्तलेखनायेन शस्त्रेण दन्तशक्तरात्मा दन्तलेखनात् शक्तरात्मान् लेखयेत् कर्षयेदिन्द्रियः । दन्तलिप्याने अनेनेति दन्तलेखनं दन्तशक्तरा पायति प्रति लोके ।

Vāgbhaṭa Kramāñḍī, I. xxvi.

recommended to be used for the extraction of sordes and tartar from the teeth ¹.

The procedure of the operation of tooth-extraction is not described in detail in the medical books of the Hindus. But the operation seems to have been well known, for Suśruta distinctly advises the students to practise the operation of extraction on the fruits of Panas (*Atrocarpus Integrifolia*), Vimbī (*Cephalandra Indica*), Vilva (*Egle Marmelos*) and on the teeth of the dead animals ². He also advises us to extract the wisdom teeth and to apply cautery to their sockets ³. Also when a tooth becomes loose he directs us to extract it and apply cautery to the socket ⁴. In the treatment of sinus caused by carious tooth, he advises us to extract the tooth, otherwise the sinus would extend down to the inferior maxillary bone ⁵.

¹ शस्त्रेण दन्तवैद्यर्भं दन्तमूलानि शोधयेत् ।

* * * *

अहिंसन् दन्तमूलानि शक्तरामुद्विष्ट भिषक् ।

Suśruta Saṁhitā, IV. xxii.

² See foot note 2, P. 280.

³ चहृत्याधिकदन्तन् ततोऽप्यिमवचारयेत् ।

लभिदन्तक-वशापि विधिः कार्यो विज्ञानता ॥

Suśruta Saṁhitā, IV. xxii.

⁴ चलमुहूर्य च स्थानं विदहेच्छु विरसा च ।

Ibid.

⁵ यन्तरमधिगायेत नाडी तंदन्तमुहरेत् ।

कित्वा मासानि शस्त्रेण घटि नोपरिजीभयेत् ॥

शोधयित्वा दहिङापि चारिष्व चलनेन च ।

भिनश्य दिचिते दन्ते इनकास्य गतिमुखः ॥

समूले दग्धनं तथाद्विष्ट भस्त्रमस्य च ॥

उडुतेगृहर दन्ते सगृहे श्वरवस्त्रे ॥

Ibid.

Pālakāpya¹ mentions the extraction of tooth of the elephant by means of enīpada which is an iron bar, thirty-two aṅguli long and equal to the tooth in circumference,

Paul says²: "The laminae which unite to them (the teeth) we may remove as may appear proper, with the concave part of a specillum, a respiratory, or a file." The operation of tooth-extraction was however, not liked by the ancient Greeks as cases in which the operation proved fatal, occurred in their practice. Caelius Aurelianus, Herophilus, and Galen disapprove in general of the operation, except in extreme cases.

It would, no doubt, be interesting to know that in ancient India, the Hindus knew how to make false teeth to be used by men who have lost them either by accident or by extraction by the dentists. In 1194 A.D., Sahabuddin defeated Jayacandra in battle, "and the incident of the body of the rāja being recognised by his false teeth"—a circumstance which throws some light on the state of manners" is well known.

20. ESĀNTI OR SHARP PROBES.

"The probes", says Caraka³, "are of two kinds, the hard or

¹ वासिंशद्दुलायतदशनपनि नाहेन लीहदस्तेन ।
एनीपदिन कृष्णादुत्तरस्थं तयोः सम्बक् ॥
ब्रौहिमुलेन च परिशोध्य सविनासर इत्तमुलेषु ।
उच्छोदकधीतेतु मधुमर्पिः पूरणं दद्यात् ॥

Pālakāpya, III. xviii.

² Paul, VI. xxviii.

³ Elphinstone's History of India, P. 365, 5th Ed.

* विविधामेषणां विद्याम्भूत्वं कठिनामपि ।
उत्तिर्देव द्विमानावैलोद्वानां च अलाक्ष्या ॥
गभीरमांसमि देशे पार्वते लीहगलाक्ष्या ।
एवं विद्याद वर्णं नालेदिपरीतमतो भिषक् ॥

Caraka Saṁhitā, VI. xii.

metallic probes, and the soft probes such as the young stems of plants. The hard probes are required for deep sinuses in the fleshy parts and the sides of the body, while the softer varieties are used for probing the superficial sinuses². The ends of the probes are generally shaped like the head of the earth-worms³. Suśruta² describes them to be eight anguli long. They are to be used as probes to ascertain the direction of sinuses.³ The blunt probes have been described before under the śalākās.⁴

The sharp probes have the shape of a needle and are six anguli long. The other end carries an eye through which is put one end of a caustic thread (*i.e.*, thread soaked in caustic lotion and then dried). The probe is to be used for piercing the tissues through the blind end of the sinus. The end of the thread is next to be withdrawn from the eye of the probe and a tight knot applied with the other end. The intervening bridge of tissues is thus gradually cut and the sinus opened. If the cord be found inefficient for the purpose, a second thread is to be tied similarly.⁵

¹ एषचौ मस्तुपदाकारसुखौ ।

Suśruta Saṃhitā, I. viii.

² तत्र नम्भश्चलं प्रसापदाहृते ।

Ibid.

³ यतेरत्वेषये अस्त्रा मस्तुपदसुखेषचौ ।

Aṣṭāṅga Hṛidya Saṃhitā, I. xxvi.

एषाम्बद्धः मस्तमाह यतेरित्यादि एषचौनाम शब्दः गतेः नाडीवृक्षस् पूर्णदिवकसा अनेषये अन्वित्यर्थे योज्यः । सा चैषनी द्रुक्षा कीमत्स्यग्नां, तथा मस्तुपदसुखा, महीकला सुखाकार सुखा च भवति ।

Vāgbhaṭārtha Knumūḍī, I. xxvi.

* See page 165-7.

* हृष्टद्रुव्यवभीरसां नाडीमर्गं गिराव या ।

सारस्मृतेष्य तां हिन्दान् तु अस्तेष्य इन्द्रिमान् ॥

This method of treatment is recommended for the weak and timid patients. The needle-shaped probe is also to be used in the extirpation of new growths by means of caustic threads. Cakradatta¹ also describes this operation; evidently he copies it from Suśruta. In the Yogaratnākara² the verses describing the operation are also quoted. Vāgbhaṭa also mentions a needle-shaped probe for the same purpose.³

In treating of fistula-in-ano, Paul quotes from Hippocrates and says⁴ :—“For Hippocrates directs us to pass a raw thread,

एषस्या गतिमनिष्ठ चारसूत्रमुसारिण्योम् ।
दूर्वी निदभाङ्गत्वने तथोद्धमाय निहरेत् ॥
दृष्टस्थानं समालैय जातवन्नं समाचरेत् ।
ततः चार वर्ष बौत्त्वं सूत्रमन्तृ प्रवेशयेत् ॥
चाराकं नितिमान् वैद्यो यावत्तच्छिद्यते मति ।
भगवन्दरे, प्ये प विधिः कार्यः वैद्येन आनन्दः ॥
चल्वदादिसु चौतुष्प्रय मूले सूत्रं निधापयेत् ।
दूर्वीभिर्द्विवक्त्वमिराचित्तं वा समन्ततः ।
मूले सूत्रेण वड्डीयाच्छिद्यते चौपचरेद्वायः ॥

Suśruta Saṃhitā, IV. xvii.

¹ These verses are quoted in the Cakradatta, Nādiṣṭraṇa Ālīkiā.

² Also quoted in the Yogaratnākara, P. 346.

³ मेदनार्थपरा दूर्वीसुखा सूलनिविष्टस्ता ।

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

अपरमयेष्यो शक्तमाह । मेदनार्थे इवादि मेदनार्थे नाहीवकानां गतिमेदनार्थे अपरा पूर्वोक्ताया एषस्या अन्वा दूर्वीसुखा तथाकार सुखा चात् तथा मूले सूलदेशे निविष्ट, सूत्रनिवेश योग्यं स्वं हिंदू यस्याः सा सूलनिविष्टस्ता सच्छिद्मूलमिवयः । अस्या एषस्यामूले हिंदकरणं चारकेमूलनिवेशनाय । तेन एभिन्न दारनिकागतिन हट्टवन्देन चारसूत्रेण नाहीवकारः प्रकाश्यते ।

Vāgbhaṭārtha Kaumūḍī, I. xxvi.

⁴ Paul. VI. lxxviii.

consisting of five pieces, through the fistula by means of a probe having a perforation, or a double headed specillum; and to tie the ends of the thread and tighten it every day until the whole intermediate substance between the orifices be divided and the ligature fall out". Hippocrates¹ describes minutely the apolinose and recommends it for those who from timidity avoid a surgical operation. Celsus recommends the thread to be smeared with some escharotic ointment. The process, he says, is slow but free from pain². Albucasis³ also approves of the operation according to circumstances. The operation called apolinose *i.e.*, by the ligature, is very celebrated. Ambrose Pare, Foubert, Camper, Giudo de Cauliaco and Rogerius approve of the ligature. It has been recommended by some of the modern surgeons⁴. The operation is still practised in India by the Madrasi specialists for fistula-in-ano.

Vāgbhaṭa⁵ describes copper probes having the sharp ends shaped like the buds of Kuravaka (Baleria Cristata) to be used in

¹ Hippocrates. 'De Fistulis'.

² Celsus. vii. 4.

³ Albucasis. Chirrug. ii. 80.

⁴ Lancet. vol. I. 1845, new series.

१ तामी शलाका विसुडा सुखे कुरवकाकृति ।
लिङ्ग नामं तथा विचेत् ॥

Aṣṭāṅga Hṛidaya Saṃhitā. I. xxvi.

शलाका शस्त्रं अद्भुति शस्त्रवाह तामीवादि विसुडा, विडापा, सुखे, सुखप्रदेशे कुरवका
कृति, रक्तमिळीपुष्प सुकुलकारा, तामी, तामवयी, शलाका, शलाका शस्त्रं स्पात् । तथा
शलाकया लिङ्गनामं, कफोत्त्वं पठल संज्ञकं चक्षरीम् विशेषं विचेत् । विचेदित्यने न
चेदः ।

Vagbhataśartha Kaumudi I. xxvi.

the operation of cataract. Suśruta¹ describes such a probe to be eight aṅguli long, made of copper, or iron, or gold, the ends being shaped like buds. A thread is spirally twisted round the middle of the instrument for a length of a thumb's breadth, to afford a firm grasp by the surgeon's fingers. This instrument must not be rough, thick or very sharp, for then there would be a greater chance of the eye being injured more than is necessary and at many places. So also in couching of cataract, Celsus says : "Then a needle is to be applied, sharp so as to penetrate, but not too fine."²

Pālakāpya³ mentions eṣaṇī in the surgical treatment of diseases of the elephants. He describes three probes,—smooth and shaped like the collyrium rods. They are recommended to be ten, twenty and thirty aṅguli long respectively.

¹ यत्काका कङ्गशाश्वलं स्वरा दोषपरित्रुतिः ।
ब्रह्म विशालं न्युकाभा तौजा इंसादनेकधा ॥
यत्काकावनु विषमा कियासङ्गमवास्त्रिरा ।
करोति वजिता दोषैकादभिहिता भवेत् ॥
चक्राङ्गुलायता मध्ये शूलेण परिवेदिता ।
चक्राङ्गुलं पञ्चसमिता वक्षयीर्थुकला छति ॥
ताम्बायसी शालकीर्थी शालाका सादनिन्दिता ।

Suśruta Saṃhitā, VI. xvii.

² Celsus. VII. viii.

³ शिरा च हौ च कर्तव्य व्रशानामिष्वदी भवेत् ।
हता गच्छुपदसुखी प्रमाणे विशदाङ्गुली ॥
मुवच्छक्यतामायामायसी अङ्गाङ्गापि च ।
दलाम्बिष्वेनुदाक्षामिष्वदी दाक्षा भवेत् ॥

Pālakāpya, III. i.

एषदी दशाङ्गुला विशदाङ्गुला विशदाङ्गुला यद्यायोगमनवनश्वलाकाङ्गुलि सुखतः प्रक्षा चमा
येवमिताक्षिष्व एषदीः प्रमाणतः कार्याः ।

Ibid. III. xxx.

The operation of couching for cataract is essentially an Indian operation; and Suśruta describes the operation minutely as follows :—

The operation of couching for cataract.

Suśruta says¹ : "Now we shall describe the treatment of cataract caused by phlegm. If inside the crystalline lens, anything is seen like a half-moon-shaped drop of water or pearl, hard, irregular

* श्वेषिके लिङ्गामे तु कर्चं बचामि सिद्धये ।
नचदहैन्दुधर्माम्बुदिन्दुकाङ्गतः; स्थिरः ॥
विषमो वा तनुर्भये राजिमान्वा वहप्रभः ।
हटिस्यो लक्षणे दोषः सूक्ष्मा वा मूलोहितः ॥
स्थिरस्त्रिहसा तसाय काले नामुच्छीतते ।
यन्तितस्योपविद्या स्खानासां पश्चतः सम् ॥
मतिमान् शुक्रभागी दी क्लेशामुकाहपाइतः ।
उन्मोक्ष नयने सम्यक् विराजान् विचर्जिते ॥
नाथो नोईच पार्वत्यो विद्रे देवकते ततः ।
शलाकया प्रयत्ने विवक्षा यववक्षया ॥
मध्य प्रदेशिवाङ्गुठस्त्रिहसा महीततया ।
दक्षिणेन भियक् सञ्च विषेन सञ्चेन चितरतः ॥
वारिविन्दागमः सम्यक् भवेच्च अद्वद्वा व्यथे ।
संसिद्ध विहमावनु योषित्वानेन कोविदः ॥
स्त्रिरे दोषे चले वापि स्ते ददेवदक्षि वाक्षतः ।
सम्यक् शलाका संस्थाप्याभैर निकानाशनैः ॥
शलाकयेण तु ततो निर्जिहिंडिमरुतः ।
विधतो योइन्य पात्रैङ्गात्मा रुदा नासिकापुर्टः ॥
उच्छिहनेन हत्यो हटिमन्डलजः कफः ।
निरम इव घर्मायूद्यदा हटिः पकाशते ॥
तदासौ लिङ्गिता सम्यन् चैया याचापि निर्ब्यादा ।
ततो हटेतु रघेतु शलाकामाहरेच्छनैः ॥

or thin, striated or shinning, painful or red, caused by the deranged humours, the oleaginous applications and fomentations are to be tried first at a time when it is neither hot nor cold; then he (patient) is to be ligatured after having him seated conveniently, and should be directed to look towards his own nose. The intelligent (surgeon), then separating the white part from the black part and the external canthus of the eye after opening it, avoiding the vascular network, and leaving the parts above and below intact, is to pass a yavamukhi śaliṅkā (or sharp needle having its end resembling a wheat) through a natural opening on the side, steadily holding the rod with the thumb, index and middle fingers. If the operation be required on the right eye, the left hand, and if on the left eye, the right hand of the surgeon should use the needle in puncturing. A successful puncture is known by the escape of a drop of fluid and an audible sound. The experienced surgeon is to sprinkle woman's milk just after the puncture, and keeping the needle there, whether the deranged humour be movable or not, should apply fomentations externally by means of oily remedies for the deranged air. The crystalline lens is next to be scarified by the sharp end of the needle. Then keeping the needle fixed in the side of the eye, the patient should be directed to sniff so as to destroy the phlegm of the lens. The proper scarification will be indicated when the lens appears brilliant as the sun uncovered by clouds. Then the vision being clear, the needle in the side of the eye, is to be removed; and the eye is to be well

धृतेनाभ्यज्य नयनं पञ्चपद्मे विद्येत् ।

ततो मर्हे निशाकां श्यौलीत्रान् एव च ॥

soaked with ghee (melted butter) and bandaged properly." Vāgbhaṭa also describes the operation similarly.¹

To this we may compare the account of the operation as given by Celsus. He "lays it down as a rule, that when the suffusion is small, immovable, and of the colour of sea water, or of shining iron, and if a small degree of light can be perceived at the side, there is reason to hope well of the case. He forbids us to operate until the disease has attained a proper consistence. He directs us to place the patient opposite the operator, who is to sit on a higher seat, while the patient's head

अय साधारणे कालि यहमेभीनिताक्षतः ।
देश प्रकारे पूर्वाङ्गे भिन्नग् जानुव यीउगः ॥
यान्तितसोपविदस्य लिङ्गादस्य मुखानिलः ।
अहृष्ट चटिते नेते हटी हडीत्प्रते मलम् ॥
स्वनासो प्रे चामाणस निकल्यं मुख्यं धारिति ।
त्रिचादहाँइले सुका तदर्हाँमपाइतः ॥
तज्जनीमध्यमाइड़े शलाका नियते इताम् ।
देवचिद' नयेन् पावादौमामस्यदिव ॥
सब्ये दिविषाहकेन भेत' सब्येन चेतरत् ।
विषेत् सुविडे शब्दः स्वादक चाम्बुलवसुतिः ॥
मानववशातुरं चानु निते शब्येन सेचयेत् ।
शलाकाकाष्ठातोऽयेष निलिम्बेकमकडुले ॥
अवाधनामः गनकैर्नार्सा प्रतिनुद्दलतः ।
उच्छिच्छनामापहरेद् इटिमशङ्कलं कक्षम् ।
स्त्रिरे दोषे चले चापि स्ते दिवेदचिवाचातः ॥
अय हटेषु कपेषु शलाकामाहरेच्छनैः ।
इतामुतं पिचुंदला वज्ञाचं शावयेततः ॥
विहादनेन पाचेन तसुतानं इवोच्छे ।
नियाते शयनेऽभ्यलशिरः पाढे इत्तेरतम् ॥

is held by an assistant. The sound eye is to be previously covered up with wool. If the left eye is affected, the operator must use his right hand, and *vice versa*. A needle which is sharp and not too slender is to be passed direct through the two coats at a place intermediate between the temporal angle and the black of the eye, and towards the middle of the cataract. When the needle has perforated far enough, which is readily known by the absence of resistance, it is to be turned so as gradually to remove the cataract below the region of the pupil and this object being attained it is to be strongly pressed to the lower part. If it remain there the operation is completed, but if it return, it is to be cut and torn by the needle into many pieces, in which state they are easier depressed, and prove less troublesome. The needle is then to be drawn out direct and soft wool smeared with white of an egg, and other anti-inflammatory applications are to be used. Quiet, restricted diet, and soothing treatment will be proper.¹" Paul², Mesue³, Albucasis⁴, Rhazes⁵ and others also describe the operation of couching in similar terms. Albucasis gives figures of these needles.

The operation is still practised in India by the māls who consider themselves specialists in diseases of the eyes.

21. SARPĀSYA.

Vāgbhaṭa describes an instrument having its end resembling

¹ Celsus, vi. See Adam's Commentary to Paul VI, xxi.

² Paul, VI, xxi.

³ Mesue. De Aegr. oculi, 15.

⁴ Albucasis. Chirrug, II, 23.

⁵ Rhazes. Ad manus.

the mouth of a snake¹. The blade is said to be half an anguli long. It is advised to be used for excision of the nasal and aural polypi.

The fact that it was able to work inside the nose and the auditory canal shows that it could not have been of any great breadth, possibly less than a quarter of an inch at the most. The exact shape of the sarpasya can not be determined with certainty. The Greeks however used for the same purpose, "a polypus scalpel, having its extremity shaped like a myrtle leaf," which was a double instrument, the other end being a scoop².

GOLD OR SILVER KNIFE.

To cut the navel cord, Caraka³ recommends the use of a knife, made of gold, or silver, or iron. To make gold and silver knives of sharp edges seems absonous to our reason, but we must remember that to cut the navel cord, a very keen edge is not required, and even now the purpose is often served by the native dhāis with a piece of split bamboo.

¹ सर्पासा प्राणकर्त्त्वार्थस्तेदनेऽहाङ्कुलं फले ॥

Aṣṭāṅga Hṛdaya Saṃhitā. I. xxvi.

सर्पासं नाम शस्त्रमाहः । सर्पासं इत्यादि सपासं नाम शस्त्रं नामिका कर्त्त्वार्थसां हिदने योज्यं तद्ध फले अहूलाहृष्टपरिमितं अहूलाहृष्टपरिमितं फलकमित्यर्थः । असा सर्पेनुखसहव्र
सुखलात् सर्पासाभिति संज्ञा ।

Vāgbhaṭārtha Kaṇmūḍī. I. xxvi.

² Paul. VI. xxv.

³ See foot-note 4. P. 65.

PRATUDA.

Suśruta mentions it as a knife to be used for making scarifications on the body of a lunatic.¹

The mode of holding the sharp instruments.

Suśruta says² : "The vriddhipatra is to be held at the junction of the handle and the blade; and all instruments used for incision should be held similarly. The vriddhipatra and mandalāgra, if used for scarification, should be held with the hand raised a little; when used for evacuating abscesses, they, as well as all other instruments, should be held by the fore part of the handle. But in the case of children, old or delicate or timid persons, women, and kings and princes, abscesses should be evacuated with the trikūrcaka. The vrihimukha is to be held with the thumb and forefinger, its handle being covered within the palm. The kuṭhārikā is to be held in position with the left hand, and struck with the middle finger when let go forcibly from the under surface of the thumb of the right hand. The ārā, karapatra and eṣanī should be held at their extremities.

¹ प्रतुदैर्दांश्वेत् शैनं मध्यधात् विवर्जयेत् ।

सपि॑ धाने जरत्कृपे सततं वा निवासयेत् ॥

Suśruta Saṃhitā, VI. iii.

² तेषामव्ययोग यहक समाप्तोपादः कर्चसु वस्यते । तत्र डिपत्रः डनफलसाधारणे भासि रक्षीयोऽनान्तेवं सर्वाणि । डिपत्रः मषडलाबच्च किञ्चिद्दूनानपाणिना लिखने वाह्योऽवचार्यं छलाये विश्वावशानि । विशेषेण बालवडमुक्तमार भौद्र नारीणां राज्ञा राजपुत्राणाच्च तिकूर्यकेन विश्वावयेत् । तत्र प्रच्छादित डनानहुः प्रदेशिनोभ्या ग्रीष्मिसुखः । कुटारिकां वामहसान्यकामित-रहस्यमाङ्गुल्याहुः विश्वावयामिहन्तान् । आराकरपैदयण्डो मूले । ग्रीष्माणि तु धृष्टायोग्यं ग्रहीयात् ।

Suśruta Saṃhitā, I. viii.

The other instruments are to be held as required in particular cases." Vāgbhata also gives similar directions¹.

The practical training in surgical operations.

Suśruta says²: "Even after a pupil has mastered the whole of the medical treatises, the preceptor should instruct him practically how to perform surgical operations and how to administer oils and other medicines. However learned he may be in books, he cannot be fit for surgical practice, unless he has acquired the practical training. Therefore the preceptor should show his pupils the methods of operations, of incision, excision and division, upwards and downwards on the pumpkin, bottle-gourds, water-melons, and the three varieties of cucumbers—Trapusa (*Cucumis Sativus*), Ervārūka (*Cucumis Utilissimus*), and Karkarūka (*Cucumis Melo*).

१ हिंद मेदेन लिस्यादें गत्वा इन फलान्तरे ।
तत्त्वंनी मध्याहु देष्ट ज्ञोदात् सुसमाहितः ।
विस्तारचादि इनादे तत्त्वाहु देष्ट के न च ।
तत्त्वं प्रकृत्वा इनादे यात्प्र ज्ञोहिमुखं सुष्ठे ।
मूलिकाहरचार्यानि जिदा सौकर्यंतोऽपरे ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

* अधिगत सर्वज्ञानार्थमपि जिष्ठ योग्याहारयेत् । जिदा दिष्टु खेहादिष्टु च कर्मपदमुप-
दिग्नेत् । सुवहश्चतोपकृत योग्यः कर्मस्ययोग्यो भवति । तत्र पुष्पकलात्मा वा कालिन्दक-
तपुष्पज्ञाहककर्कारिक प्रभतिषु हिंशु विशेषान् दर्शयेद्दत्तकर्मपरिकर्मनानि चोपदिग्नेत् ।
हति वस्ति प्रसेवक प्रभतिष्टदिकपद्म पूर्णशु भेद्य योग्याः । चरोचि चर्याहतात्मे लिस्यस्त ।
स्त्रत पद्मिरामृतपत्तनालिपुच विद्यस्त । चुकोपकृत काहवेण नलनालौग्यकालात्मसुख्ये अस्त ।
पनश्चविलोक्यत्तपत्तपशुद्दलोच्चाहार्यस्त । मध्यक्षिद्दीपतिष्ठेत जावलीफलके विस्तारस्त ।
सूक्ष्मचनवस्त्रालयोद्दृवमौलयोद्व मौल्यस्त । पुष्पमय तुरथाहप्रत्यक्ष विज्ञेष्टु वस्तयोग्याः ।
स्त्रदमांसुपेशीष्टपत्तपत्तनालिपु च कर्यं सम्बिवस्योग्याः । स्त्रदृप मांसमूर्छाष्टिचारयोग्याः । उदक
पूर्णचटपात्र ज्ञोतत्त्वात्मा तुरथादिष्टु च नेत्रप्रशिधानवस्त्रित्वा वस्ति पौडन योग्यामिति ।

Saṃkrota Saṃhitā, I. ix.

The operation of puncturing or tapping may be demonstrated on leather bags, bladders and pouches, filled with slush; scarifications, on stretched pieces of leather covered with hair; opening on the veins of dead animals or on stalks of water-lily; probing on worm-eaten wood, bamboo, reed, tube or dried bottle-gourd; extraction, on the pulp of jack fruit, the Bael fruit (*Ægle Marmelos*), Vimbi fruit (*Cephalandra Indica*) or on the teeth of dead animals. Evacuation on a lump of wax applied to a board of Sālmali wood (*Bombax Malabaricum*); sewing, on the two ends of a thick piece of cloth or soft leather; bandaging on the limbs of a dummy (human figure made of cloth and clay), bandaging the root of the ear, on a piece of soft flesh, or the stalk of a water-lily; application of cauteries, on pieces of flesh; introduction of tubes for clysters (urethral, rectal and vaginal) and wound-syringe, on the spout of an earthen vessel filled with water, or on the mouth of a bottle-gourd or similar objects."

CHAPTER VII.

THE ANUŚASTRA.

The anuśastra means substitutes for cutting instruments. They are the following¹ :—

1. Bamboo.
2. crystal.
3. glass.
4. ruby.
5. leeches.
6. fire.
7. caustics.
8. the nails.
9. leaves of Goji (Elephantopus Seaber).
10. Śephālikā (Nyctanthe Arbortristis), and
11. Śākhā (Tectona Grandis).
12. young stems of plants.
13. hair.
14. finger.

These are advised to be used in case of infants or timid persons or when the proper instruments are not available.²

1. BAMBOO.

A piece of split bamboo is said to have been used for cutting through and cutting into some parts of the body. It is still used by the native dhāris or midwives for cutting the funis.

A piece of bamboo is directed to be used for applying pressure on small boils to cure them by subsidence³. For the same purpose, the pressure of the thumb is also recommended⁴.

¹ अनुशस्त्राचि तु लक्ष्मारस्फटिककाचकुरहिन्दजलीकाश्रित्वारनखगोजीशेकालिका-आकपत्र करीरवालाहुलय इति ।

Suśruta Samhitā. I. viii.

² शिशुनो ब्रह्मभीरवां शक्वाभावे च योजयेत् ।
लक्ष्मारादि चतुर्वर्णे हैदे भेदे च डुडिमान् ॥

Ibid.

³ हतेपु दोषेपु यथानपूर्वे यन्ती भिषक् शेष मसुलिते तु ॥
स्त्रिवस्य विक्षापनमेव कुण्डाहुष्टलीहोपलवेतु दक्षः ।

Ibid. IV. xviii.

⁴ अन्यत्र स्त्रेदयित्वा च विग्ननाश्या ततः शर्णः ।
विक्षापनार्थं वर्षीयत् तस्मिन्नाहुहकेन वा ॥

Cakradatta, Vrapaślothī Cikitsā,

Bamboo is also mentioned to have supplied largely the materials of splints for treatment of fractures and dislocations. For this purpose it is to be split into thin layers¹. Split bamboo is still used for the treatment of fractures by the kavirājēs and might advantageously be used by the modern surgeons as a cheap and easily available material for splint.

Dissection.

It is generally supposed that the practice of dissection of the human body for anatomical studies was unknown to the ancients. But the practice of human dissection is unmistakably referred to in the Suśruta Saṁhitā.² Brushes made of bamboo, barks of trees, grass roots, and hairs are mentioned as instruments of dissection. "Thus a body should be secured which is complete in all the parts and which is of a person who was not more than 100 years old, nor who died from the effects of poison or of a chronic disease. Having cleared the intestines of any faecal matter, the body should be well wrapped either in Muñja (Saccharum Munja), or grass, or barks of trees or hemp etc., put inside a cage which should be firmly fastened, in a solitary spot, in a calm river and thus allowed to decompose. After seven nights, having taken out

¹ विभ्रश्च नरं हडा वेचुखके न वस्येत् ।

स च वैद्रवनीतौ रस्तपचय वैष्टयेत् ॥

Hārita Saṁhitā, II.I Ivi.

² तथान् समसागाच मविदोपहतमदीघव्याधिपीडितमवयं शतिक' निःस्थान्वपुरीष' पुरुषम् बहन्यामापगायां निवद्य' पञ्चरस्य' मुखवलकलकुगण्णादौ नामन्यतमेनाविदिताइनमकाशि देहे कोदयेत् सम्बक् प्रकृथितक्षीहृत्व तसी देह' सप्तरात्रादुष्ट्रीद चालुविषु वलकल कृचीनामन्यतमेन गनैः गनैरवधर्यय' क्षत्रगादीन् सम्बन्धिव वाक्षाभन्नराहप्रव्यहृ विशेषान् वयोक्तान् लक्षयेद्वायुष ।

Suśruta Saṁhitā, III. v.

the thoroughly decomposed body, it should be slowly rubbed with a brush made either of Uṣira (*Andropagon Muricatus*) or hair, or bamboo, or barks of trees, examining at the same time with the eyes, every division and sub-division of the body, external or internal, beginning with the skin, as delineated in the śāstras." Animal anatomy was also thoroughly understood as each part of the body had its own distinctive name.

Hoernle¹ says : "Probably it will come as a surprise to many as it did to myself, to discover the amount of anatomical knowledge which is disclosed in the works of the earliest medical writers of India. Its extent and accuracy are surprising, when we allow for their early age—probably the sixth century before Christ—and their peculiar methods of definition.*** Of the practice of such dissection in ancient India we have direct proof in the medical compendium of Suśruta, and it is indirectly confirmed by the statements of Caraka. It is worthy of note, however, that in the writings of neither of these two oldest Indian medical writers is there any indication of the practice of animal dissection."

The Greeks did not practise dissection of the human body. "The anatomical knowledge of the Hippocratists was derived chiefly from dismemberment of animals, experience in slaughtering and sacrifices, and from the observation of surgical cases. Systematic dissection of the human body was out of the question owing to the religious precepts which strictly enjoined immediate burial, and to the superstitious horror of the dead which then prevailed. The supposition that outstanding individual investigators, upon rare occasions, did not hesitate to examine

¹ Hoernle. Osteology. Preface, iii.

human bodies or parts of bodies (particularly) bones, in order to correct prevailing opinions, is one which, if not susceptible of direct proof, is at least probable. This supposition, besides being borne out by many statements on the part of ancient writers, is the more probable since the bodies of savages, traitors and criminals were outside the pale of religious ordinances and were therefore available, as were also accidentally obtained portions of the body, to satisfy the curiosity of scientific investigators. No one of the oft-quoted extracts from the Hippocratic writings, supposed by individual historians to refer to human dissection, is quite conclusive, whilst nowhere is there in the pathology of the day any definite trace of anatomical research upon the bodies of those dead of disease. On the other hand comparisons are frequently instituted by the Hyppocratists referring to facts acquired through zootomy or to anatomico-pathological discoveries such as might have been made in the slaughtering of beasts."¹

The study of anatomy received its impetus from the Alexandrian School. "Herophilius improved the technique and developed the terminology of anatomy and enriched it by valuable discoveries made in the dessecation of human bodies, particularly in the knowledge of nerves, vessels and viscera, but also in that of the eye. With his works, systematic anatomical investigation may in fact be said to begin."²

"Like Herophilus, Erasistratos made a successful study of anatomy, even surpassing the former in knowledge of details, and in a series of observations upon the cadavers of men and

¹ History of Medicine. Neuberger. P. 150.

² Ibid. P. 177-8.

animals, corrected his own mistakes as well as those of others. His greatest achievement was in the study of nerves and vessels."¹

2, 3 AND 4. CRYSTAL, GLASS AND RUBY.

These are recommended to be used for cutting through and cutting into some parts of the body.

Glass vessels for preparing medicines are often mentioned. Śārhgadbara² used it for purifying mercury.

5. LEECHES.

Leeches are described to be the mildest of all means for extracting blood, and are recommended for princes, children, women, and timid people³.

Twelve kinds of leeches are described⁴; six of them are poisonous and six, non-poisonous.

¹ History of Medicine. Neuberger. P. 181.

² कालकृष्णो विनिश्चित्य ताद्य सदस्यमुद्रया।

विलिप्तं परितो वक्तं मूढां दत्ता च शैषयेत्॥

Sārhgadbara Saṅgraha, II. xii.

³ गृप्तावालस्यादिर भौकदुर्ज्ञलनारो मुकुभाराणमनुशङ्खाणं परमसुकुमारोदयं शोणितावसि च नोपायोऽभिहितो जनौकमः॥

Saṅkuta Saṅhitā, I. xiii.

* जलमासानायुरिति जलायुका जलमासामोक इति जनौकमः। ता हादग तासां सविदा: कट् तावत्य एव निर्विषा:। तत्र सविदा: क्लेषा कर्म्मरा अज्ञायाहाँ इन्द्रायुधा सामुद्रिका गोचनदना चेति:। तामस्त्रन्त्रुण्डवाँ प्रद्युमिराः क्लेषा:। वर्णिमनुशवदस्यता हिंद्रोद्रत-कुचिः कर्म्मरा:। गोमश महापाचाँ क्लेषसुखलग्दा:। इन्द्रायुधवद्वृत्ताजिभिर्विविता इन्द्रायुधा। ईयदमितपीतिका विचित्र पुष्पाक्षतिनिता सामुद्रिका। गोष्यवदधोभागे द्विषामूलाक्तिरक्तुसुखी गोचनदेति:। तामिहृदे मुहूर्पे दंशे जगदुरतिमालं कर्म्मसुक्षमाँ

The poisonous leeches are :—

1. Kṛṣṇā :—it is of the colour of black collyrium and has a broad head.

ज्वरोदाहस्तदिमेद; सदनमितिलिङ्गानि भवन्ति । तत्र महानदः पानासेपननसु कर्णादियुप-
योज्ञा । इन्द्रामुखादभसाच्चमितेताः सविषाः सचिकितृसिंहा व्याख्याताः । अथ निजिष्ठाः ।
कपिला पिङ्गला शहुमुखी मूषिका पुष्टरीकमुखी सावरिकाचेति । तत्र मनःशिलारङ्गिता-
भामित्र पादाभ्यां पृथे चित्पुष्टवर्णां कपिला । किञ्चिद्रका हत्तकावा पिङ्गलग्राच पिङ्गला ।
यज्ञवर्णां गीत्रपायिनी दौर्बलीकमुखी शहुमुखी । मूषिकाकृति वर्णाऽनिष्टमस्या च मूषिका ।
सुद्रवर्णां पुष्टरीकतुलवर्णां पुष्टरीकमुखी । त्रिष्ठा पद्मपत्रवर्णाऽष्टदशाहुलप्रमाणा सावरिका
चाच प्रवर्णे । इत्येता अविष्ठा व्याख्याताः ।

तासां प्रयहस्यमार्दचर्येष्यान्वेष्या प्रयोगेष्यं हीयात् । अद्यैनां नवे महति घटे सरसाङ्ग-
गोदकपद्मावाच्च निदधात् । भव्यादै चासामूपहैच्छैवल' वहूरभौदकांच चक्षदो-
युर्चक्षित्य व्याधै दृश्यनीदकानि च पवाणि । उरहात्त्रहावाच्चाच्चल' भव्यच्च दद्यात् ।
सहरावात् सहरावाच घटमन्य' संक्रान्तेत् । भवति चाच ।

स्फूलमध्या परिक्रिदा; एष्यो मन्दविचेष्टिताः ।

अयाहिष्ठोऽत्पपायिन्यः सविषाय न पूजिताः ॥

अथ जलौकोऽवसेकसाच्चाधित्तमुपर्यग्ना संवेष्य वा विश्वस्य चाच तमवकाशं सङ्गोमय-
चूर्चेद्यक्षजः स्यात् । गर्होत्ताय ताः सर्पपरजनीकल्पोदक प्रदिश्यगावीः सलिलसरकमये
सुशर्तस्थितिविगतलमा आत्मा तामीरोग' याहयेत् । मूषकयुक्तपिञ्जीतावच्छन्नां लत्ता
सुखमपाडग्यादस्त्रान्वये चौरिविन्दु' शोषितविन्दु' वा दद्याच्चस्वपदानि वा कुर्वेति यदेवमपि न
गर्होत्तायात्तदानां याहयेत् । यदा च निविश्टेऽप्यनुरवदानन् कल्पोन्नय च लत्तान् तदा
आनीयाद गर्होत्तायेति गर्हलौर्णो चाँडवस्त्रावच्छन्नां धारयेत् संचयेत् । दंशे तोदकन्दुमाद्भूमी-
वेच्चानीयाच्चुहमियमादेत इति युद्धमादपानामपदयेत् । अथ शोषितवायेन न सुर्वेन्मुखमस्तः
संस्वव्युत्तेनावकिर्त । अथ पतिलो लघुलक्षणप्रदिश्यगावीः तेजस्तुवयाभक्तमुखीं वाम-
हस्ताहुठाहुलीभ्यो गर्होत्तपुच्छां दद्यिष्ठक्षाहुठाहुलीभ्यो श्वासः श्वैरनुलोममनुमाच्चयेद्या-
सुखादायेतावदावत्सम्बानलिङ्गानीतिः । सम्बन्धाना सलिलसरकमया भोज्यकामा सती
चरेत् । या सौदिति न वेदते सा दुर्जाना तां पुनः सम्बन्धयेत् । दुर्जानावा व्याधिर-
साच्चाद्यन्तमदो नाम भवति । अथ सुवन्तां पूर्ववत् चक्षिदध्यात् शोषितसर च योगादीनवेद्या
जलौकोत्त्रसाम्बुद्धावपदयेच्छीतमिरिय परिवेचयेत्तीति वा व्रज' काषाय नभूर चित्रशौत्रैष
प्रदेहैः प्रदिश्यादिति ।

2. Karvūrā :—it is as long as an eel with elevated stripes across the abdomen.
3. Alagarddā :—it looks as if covered with hair and has large sides and black mouths.
4. Indrāyudhā :—or rain-bow coloured; it has rain-bow coloured longitudinal stripes on the back.
5. Sāmudrikā :—it is of dark yellow colour and has variegated flower like spots on its body.
6. Gocandana :—it has a bifurcated tail like the serotum of a bull and a small mouth.

The non-poisonous ones are—

1. Kapilā or the greenish one ;—it has its two sides of the colour of orpiment, and on its back, it is smooth and of the colour of a green pea.
2. Pingalā or twany ;—it is of a reddish-brown colour, has a round body and moves quickly.
3. Śauku-mukhī or bluish-red ;—it is of the colour of the liver, sucks quickly and has a long sharp mouth.
4. Müśikā or rat-like ;—it has the shape and colour of a rat's tail and emits a disagreeable smell.
5. Pundarika-mukhi or lotus-faced ;—it is of the colour of a green pea and has a mouth like a lotus.
6. Savarikā ;—it is slimy, coloured green like a lotus-leaf and eight angulil long; it is to be used in veterinary practice.

The non-poisonous leeches generally live in meadows and fresh water. They are to be caught with a piece of wet leather and

kept in a new large earthen pot filled with mud, water, green fungi, dry flesh, etc. The water is to be changed every third day and the pot every seventh day.

To apply leeches, the patient is directed to lie down and the part is to be rubbed dry with powdered cow dung and earth. The leech is then to be smeared with a paste containing turmeric, mustard and water, to excite them, washed thoroughly with water and then applied, its body being covered with a piece of wet cloth. To fix it quickly, a drop of milk or blood is to be applied over the diseased part, scarification of which is also recommended instead. When the leech has removed the necessary quantity of blood, a small quantity of salt is advised to be sprinkled upon its head to make it drop off. Then the leech is to be put upon some powdered rice and its mouth is advised to be smeared with oil and salt.

Then it is to be stripped and put in fresh water, and should be used again, if it moved, but if languid, thrown away.

The leech-bites are to be smeared with honey, cold water and astringent substances, or poulticed.

Vāgbhaṭa also gives similar directions for the application of leeches.¹

१ जलीकमन् सुस्थिनो रक्तसावाय योजयेत् ।
दृष्टाव्युत्स्मा भिकाहि शवकीषमनोऽवाः ॥
रक्तः चेता शूर्णं लच्छरथपत्ता च्युलपिच्छित्ता ॥
इन्द्राव्युधविचिद्वोऽहुराजयो रोक्षाय ताः ।
मविदा वर्ज्येत्ताभिः कण्ठुपाकं च्वरभस्माः ॥
विषपित्तासन्तु काष्ठ्यं तत्र ग्रहाव्युजाः पुनः ।
निर्जिंघा शेवलस्त्रावा तता नीवैर्हराजयः ॥

Dr. Ray has clearly shown that "the description of leeches as given by Rhazes agrees almost word for word with that of Suśrata (Sānasrad) in many places". He describes the parallelism at length and comes to the conclusion "of the use of a chapter of the Susruta or some such work¹".

6 AND 7. FIRE AND CAUSTICS.

The use of cauteries in surgery has been described before under the head of the accessory blunt instruments².

कथाव पृष्ठालंबः; किञ्चित् पीतदराय वा; ॥
 ता अथसम्बग् वसनात् प्रततच निपातनात् ।
 सोदली; सलिङ्गं प्राप्य रक्तमता इति व्यजित् ॥
 अदेतरा निशाकल्प युवे इष्टसि प्रियताः ।
 अवचितसोमि तकेवा पुनरावासिता जन्मे ॥
 काषयेद् एतमत्थाऽप्य रक्त निपातनैः ।
 पिण्डीकम्भहत क्षम्भाश्वादयेन्मद्वासमा ॥
 संषकाऽप्य ग्राहकालीका दृष्टोशितम् ।
 आदते प्रदर्श ईसः चौरे चोरोदकादिव ॥
 दग्धम तीर्दि कन्त्रुं वा नोचयेत्तदेव ताम् ।
 पटुतेनालकदनो इत्या कर्त्तन रुचिताम् ॥
 रथन् रक्तमदाइ भयः सप्ताहं वा न पातयेत् ।
 पूर्वेव यटुता दावं सम्बग् वाने जलोकसाम् ।
 क्षमोऽतियोगाश्वल्यवौ दुर्बले सञ्चता मदः ॥
 अन्वतान्वत ताः स्वाप्या घटे सत्त्वास्त्रुभिनि ।
 लाकादिकोय नामाद्य सविदाः सुप्तदन्वयात् ॥
 अग्नही लाखवेद्यग्नान् हरिद्रा गुडमालिके ।
 शतधीताज्यपिचवसती लैपाच शोतलाः ॥

Aṣṭāṅga Hṛdaya Saṃhitā, I. xxvi.

¹ History of Hindu Chemistry, Introduction P. lxviii.

² See Page 213-0.

8 AND 14. FINGERS AND NAILS.

The uses of surgeon's fingers and nails in surgical operations has been described before¹.

9,10 AND 11. LEAVES.

Rough leaves such as those of Fig trees (*Ficus Indicus*), Gojī (*Elephantopus Seaber*), Šephālikā (*Nyctanthes Arbor-tristis*) and Šaka (*Tectonia Grandis*) are recommended for scarifying abscesses if they do not heal up after repeated opening by the knife. If there is any formation of pus in the mouth or eyelids, it may be evacuated with these leaves (Suśruta)². These leaves are also to be used for bleeding the gums in gingivitis.

To cover the wounds, Suśruta gives a list of leaves to be used according to the nature of the wound and season of the year³ :—

For air-disturbed wounds;—use leaves of Eranda (*Ricinus Communis*), Bhūrjapatra (*Betula Bhojpatra*), Pūtika (*Caesalpinia Bonducilla*) and Haridrā (*Cureuma Longa*).

¹ See Page 199-202, and 204-5.

² मुश्चीज्जीभवत् कार्यं चिरधोप कुर्वन्ते तथा ।
काकोहृष्टिका चीजीपवेदिकावर्यदस्तक् ॥

Suśrata Saṃhitā, IV. xxii.

³ एरंड भूर्जपूतीक हरिद्राशाल्नु वातजे ।
पचमात्रवल्ल यज्ञ कामग्री पतमेव च ॥
पत्राणि चौरहचालामोदकानि तथेव च ।
दूधिने रत्नपित्ताम्बो चौर्ण दद्यादिचचयणः ॥
पाठामूर्च्छागुहृष्टीनां काकनाचीहरिद्रयोः ।
पत्रच शुकनाशाद्या योजयेत् कफजे वर्षे ॥

Ibid, IV. i.

For bile or blood-deranged wounds;—use leaves of Āśvabala (Basella Rubra), Kāśmaripatna, (Gmelina Arborea), Vata (Ficus Bengalensis) and Kumuda (Nymphae Lotus).

For phlegm-deranged wounds—use leaves of Pāṭhā (Cissampelos Hexandra), Mūrvā (Sansevieria Zeylanica), Guḍuci (Tinospora Cordifolia), Kākamācī (Solanum Nigrum), Haridrā (Curcuma Longa) and Śuknāśā (Oroxylum Indicum).

For similar purpose Caraka¹ recommends us to use the leaves of Kadamva (Anthocephalus Cadamba), Arjuna (Terminalia Arjuna), Nimva (Azadirachta Indica), Pātali, Pippala (Ficus Religiosa) and Arka (Calotropis Gigantea).

The leaves of the padma or nymphae are to be used for handling the eyeballs and the intestines, to replace them in their proper position when prolapsed by injury² (Suśruta) Caraka recommends lotus leaves and plantain leaves as coverings to the bleeding piles,³ Cakradatta⁴ mentions the use of

¹ कदम्बार्जुननिम्बानां पाटल्याः पिप्पलसाच् ।
त्रयं पात्कादने विदान् पताल्यक्षेत्रं चादिशेत् ॥

Caraka Saṃhitā, VI. xiii.

² भिन्नं नेतृमक्षयं रुग्मभिन्नं लक्ष्णं तु यत् ।
तद्विवेत्य यथा लक्ष्णमव्याविहृतिर्वर्णं शब्दः ।
पीडयेत् पाणिना सूच्यक् पद्मपतालरेण तु ॥

Suśruta Saṃhitā, IV. ii.

³ कदलोदलेरभिनवैः पुष्करं पद्मेण शोत्रजलमिकौः ।
पत्कादनं सुहम्मुहरिः पद्मोत्पत्तदलेण ॥

Caraka Saṃhitā, VI. ix.

⁴ गोचरेकालिका पवैरर्जीः संलिल्या लेपयेत् ।
चारेण वाक्षतं लिङ्गेद यन्त्रादारं पिधाव च ॥

Cakradatta, Arīśa Cikitsā.

Gojī and Śephālikā leaves for scratching the piles before the application of caustics to them. He also directs us to rub the small tumours with the rough leaves before the application of various ointments.¹ Śivodāsa also mentions the use of such leaves for rubbing the eyelids in the pillva disease.² Suśruta³ mentions the use of rough leaves for scratching any part.

Paul⁴ mentions the use of fig leaves, for rubbing down the hard granulations of granular lids.

12. YOUNG STEMS OF PLANTS.

The young shoots are described to have served the purpose of a probe. Caraka⁵ calls them the soft variety, the metallic ones being called the hard probes. These shoots are to be used for superficial sinuses. Suśruta directs us to use the young shoots

¹ विष्टव्य चोडुम्बरगाकगोजी-
पतेभूजः चौद्रयुतैः प्रलिमेत् ।

Cakradatta, Granthyarvada Cikitsā.

² वल्लादलिख्यः वहुशक्तिपच्चीचितमीचयम् ।
पुनः पुनर्विरक्तच पित्तरोगानुरो भजेत् ॥

Cakradatta, Netraroga Cikitsā.

वल्लादलिख्यमिति । कर्कशागोटकादि पदेष्व वर्तमध्येष्वम् ।

Tattva Candrikā, Ibid.

³ 'चोम' 'ग्रीत' 'पितृ' 'फेन' 'यावयकं ससैभ्यव' ।
कर्कशानि च पताणि स्त्रिघ्नायै प्रदापयेत् ॥

Suśruta Saṃhitā, IV, i.

¹ Paul, III, xxii.

² See foot-note 4, P. 269.

of the pot-herbs called Cuñea and Upālikā (*Basella Rubra*) as probes in sinuses on the eyelids and arround the anus.¹

If in young people the teeth become loose as the result of some injury, the patient should be directed to live upon milk only, sucking it through the stalk of lily; and thus affording the teeth rest and a chance of being firmly fixed again.²

To excite emesis, Śāṅgadhara,³ advises us to introduce a tube of Eranya (*Ricinus Communis*) into the throat of the patient. The vomiting is also said to have been excited by thrusting a finger or a stalk of lily down the throat.

¹ नाडी ब्रह्मान् ग्रन्थमनोदुम्बाद्युत्सङ्क्लिनः शैः ।
करिरवाऽग्निभिरेष्वका वैष्णविष्टक् ॥
नेत्रवर्म गुदाभासनावोऽवलोः शैश्चिताः ।
भूचूपोदकजोः शैः । करौरैरेष्वयुत्सृताः ॥

Sūrata Saṁhitā, IV. i.

² अमध्याश्वितान्दनान् भरतानवपीडयेत् ।
तकणस्त मनुष्यस्य शीर्षरालिपविवरिः ॥
सिंहाश्वभिस्तः शिंतोः सन्वा त्वेष्वपाचरेत् ।
उत्पलस्य च नालिन हीयान विघ्नयते ॥

Sūrata Saṁhitā, IV. iii.

³ अशीर्व कोणादानीयं सिंहं पीला वर्मत् सूधोः ।
वर्मन् पा शिल्वा च जानुमात्रामने शिवम् ॥
करुदी (क्षेत्रालिन स्त्रश्वन्) वानविष्टक् ।
सन्तुष्ट वर्मतः पुंसः पार्वी ही च शैश्चित्येत् ॥

Śāṅgadhara Saṅgraha, III. iii,

CHAPTER VIII.

HYGIENIC APPLIANCES AND HOSPITAL REQUISITES.

TOOTH-BRUSH.

The ancient Hindus used branches of trees as tooth-brush. They should have the length of twelve anguli and the circumference equal to that of the little finger. Suśruta directs us to use a straight and plain branch of such trees as have an astringent, or sweet, or bitter, or sour taste¹. Amongst these classes of trees, the twigs of Khadira (Acacia Catechu), Madhuka (Brassia Latifolia), Nimva (Melia Azadirachta), Karñja (Pongamia Glabra) are the best. The end of the stick is to be chewed first to form a brush and the teeth are then to be rubbed with it. He recommends us to use some tooth-powder,²

१ तत्त्वादी दलपत्रम् । ददशाहुः सायसे ।
कनिहिका परिगाह न अवयचितमप्यर्थ ॥
अयुम्यस्त्रि यज्ञापि प्रत्यये शस्त्रम् भिन्नं ।
अवेल्यत्तु दोषस्त्र रसं बीजेत्र योजयेत् ॥
कथाये न चुरं तिकं काटुकं प्रातकल्पितं ।
निष्ठय तिकं शेहः कथाये खदिरसामा ।
मधुको मधुरं शेहः करसः कटुके तथा ॥

Suśruta Samhitā, IV. xxiv

२ खौद्र ल्पोप तिकगाङ्कं सुतैलं सेम्पवेन च ।
दूर्घं तेजीवन्याश दलातिक्यं विजीर्धयेत् ॥
एकैकं यज्ञेहृत्तं नदुना कुञ्जकेन च ।
दलगोधम चयेन दलमासन्यवाधयेत् ॥

Ibid.

Bhāvamīśra mentions the names of other trees which may be used for the purpose,¹ and also gives us a list of trees to be avoided.² The use of the tooth-brush is contra-indicated in the various diseases of the mouth, ears, &c.³ Caraka⁴ advises us to use the tooth-brush twice a day.

१ अङ्गे वीर्ये वटे दैतिः करुचो विजये भवेत् ॥
 इये चैवादंसम्पत्तिंवदयोः मधुरोभनिः ।
 सदिरे सुखसौगम्या विशेषतु विमुखं धनम् ॥
 उद्युक्ते तु वाक्सिहिरावेत्तारोम्यमेव च ।
 कदम्बे तु भृतिमेधा चम्पके च दुष्टमतिः ॥
 शिरीये कौर्त्तिमौभास्य भानुरारोम्यमेव च ।
 अपामारे भृतिमेधा फङ्गाशक्तियावनिः ॥
 दाढ़ियां सून्दराकारः ककुते कुटजे तथा ।
 जातीतमरमन्दरेणुः स्वप्रवच विनश्यति ॥

Bhāva Prakāśa, I. i.

२ गुवाकम्भालहिनाली किंतकच छहनुण ।
 श्वर्जुरं नारिकेरच सर्वते त्रश्चात्तकोः ॥
 त्रश्चात्त च सुमुच्च यः कुर्याद् दलधावनम् ।
 नरशालडाल योनिः स्थादयावहात्र पश्यति ॥

Ibid.

३ नखादेदगलतालोट शिहारोग ससुडवे ॥
 अशास्यपाके चासेच कामहिका वभूषु च ।
 दुर्बलो जीर्णे भक्तय शूचीर्त्तिमहीडितः ॥
 शिरेकमार्त्तकृषितः आनः पानकमान्वितः ।
 अहितो चक्रश्लोच दलरोचीच भानवः ॥

Saṃkṛita Saṃhitā, IV. xxiv

४ अदोधिताय वौ कालौ कथार्य कटुतिककम् ।
 भवत्यहृत्तपवने दलमांसालवाधयन् ॥
 निकलि गम्भैरेत्तरे जिह्वादनाक्षरं मणम् ।
 निकृष्ट रुचिमाधते मर्यो दलविहीपनम् ॥

Caraka Saṃhitā, I. 7.

Suśruta mentions the use of a tooth-brush to extract a fish-bone from the throat.¹

After cleansing the mouth with water after meals, I'Tsing ordains² "Chew tooth-wood in the mouth; let the tongue as well as the teeth be carefully cleaned and purified." Again he says: "It is surely not seemly for any one to spend his time after meals chaffing and chattering, nor is it right to remain impure and guilty all day and night, without preparing water in a clean jar or without chewing a tooth-wood."

He continues³: "Every morning one must chew tooth-woods, and clean the teeth with them, and rub off the dirt of the tongue as carefully as possible. Only after the hands have been washed and the mouth cleansed is a man fit to make a salutation; if not, both the saluter and the saluted are at fault. Tooth-wood is Danta-kāṣṭha in Sanskrit—danta, tooth, and kāṣṭha, a piece of wood. It is made about twelve finger-breadths in length, and even the shortest is not less than eight finger-breadths long. Its size is like the little finger. Chew softly one of its ends, and clean the teeth with it. If one unavoidably come near a superior, while chewing the woods, one should cover the mouth with the left hand.

Then breaking the wood, and bending it, rub the tongue. In addition to the tooth-wood, some tooth-picks made of iron or copper may be used or a small stick of bamboo or wood, flat as the surface of the little finger and sharpened on one

¹ सद्गु वा दस्तावनहस्तकेनापहरेत् ।

Suśruta Saṃhitā, I. xxvii.

² I'Tsing. Records of the Buddhist Religion.—Takakusu. P. 26-7.

³ Ibid. ch. viii. Use of Tooth-woods. P. 33.

end, may be used for cleaning the teeth and tongue ; one must be careful not to hurt the mouth. When used, the wood must be washed and thrown away.

Whenever a tooth-wood is destroyed, or water, or saliva is spit out, it should be done after having made three fillips with the fingers or after having coughed more than twice ; if not, one is faulty in throwing it away. A stick taken out of a large piece of wood, or from a small stem of a tree or a branch of an elm, or a creeper, if in the forest ; if in a field, of the paper mulberry, a peach, a sophora japonica (*Huai*), willow tree, or anything at disposal, must be prepared sufficiently beforehand. The freshly cut sticks (lit. wet ones) must be offered to others, while the dry ones are retained for one's own use.

The younger priest can chew as he likes, but the elders must have the stick hammered at one end *and made soft* ; the best is one which is bitter, astringent or pungent in taste, or one which becomes like cotton when chewed. The rough root of the Northern Burr-weed (*Hu Tai*) is the most excellent ; this is otherwise called *Tsang-urh* or *Tsae-urh*, and strikes the root about two inches in the ground. It hardens the teeth, scents the mouth, helps to digest food, or relieves heart-burning. If this kind of tooth-cleaner be used, the smell of the mouth will go off after a fortnight. A disease in the canine teeth or toothache will be cured after a month. Be careful to chew fully and polish the teeth cleanly, and to let all the mouth-water come out ; and then to rinse abundantly with water. That is the way. Take in the water from the nose once. This is the means of securing a long life adopted by Bodhisattva *Nāgārjuna*. If this be too hard to put in practice, to drink water is

also good. When a man gets used to these practices he is less attacked by sickness. The dirt at the roots of the teeth hardened by time must all be cleaned away. Washed with warm water, the teeth will be freed from the dirt for the whole of life. Tooth-ache is very rare in India owing to their chewing the tooth-wood."

Tooth-Pick.

Suśruta advises us to use sticks of grass as tooth-pick after meals to extract particles of food lodged between the teeth, otherwise these will decompose and the mouth would be smelling badly.¹ Bhāvamiśra gives similar directions but adds that if any particles of food cannot be easily extracted by the tooth-pick, one must not use any force to extract them.² "After eating they cleanse their teeth with a willow stick, and wash their hands and mouth."³

JIVĀ NIRLEKHANA OR TONGUE SCRAPER.

Suśruta says: "To scrape the tongue, a golden, or silver, or

¹ दनान्तरगते चाक्रं शोधनेनाहरेत्वद्यैः ।

कुर्यादनाहते तदि मुखस्थानिष्टगम्भते ॥

Suśruta Saṃhitā, I. xlvi.

² एवं सूक्ष्मा भूमाचमिदूचयहण पूर्वकम् ।

भोजने दनान्तरगते निर्हात्वाचमने चरेत् ॥

दनान्तरगते चाक्रं शोधनेनाहरेत् गम्भैः ।

कुर्यादनिहृते तदि मुखस्थानिष्ट गम्भताम् ॥

दनान्तरगते लिपे भवेत् दनावत् ।

न तत्र बहुशः कुर्याद् यदि निहरणं प्रति ॥

Bhava Prakasha, I. i.

¹ Beal's Records of the Buddhist Religion. Trans. from Hiuen Tsang, vol. I, p. 77.

wooden scraper is to be used. It should be ten aṅguli long and must be pliant and polished¹. Caraka² mentions tongue-scraper of copper, lead or brass. Bhāvamisra³ also gives a similar discription. It is to be used for scraping the deposit on the tongue. It is still commonly used in India.

RAZOR AND SHEARS. THE PRACTICE OF SHAVING.

Every one is recommended by Suśruta to have his beard shaved, hair trimmed and nails pared.⁴ Caraka⁵ also advises

¹ जिहानिलेखनं रीष्यं सौवर्णं वार्षमेव च ।

तदुपापहरं शक्तं शदुपवक्षं दशाइतुलं ॥

Suśruta Saṃhitā, IV. xxiv.

² मूर्वर्णद्यताम्बालि वपुरीतिमयानि च ।

जिहानिलेखनानि स्वरतोऽग्रान्वशज्जुनि च ॥

जिहामूलगतं यथा मलमुच्छृङ्गसरेभिः च ।

सौवर्णं भजते तेन तथाचिह्नां विनिलिखत् ॥

Caraka Saṃhitā, I. v.

³ जिहानिलेखनं हैमं राजसं ताम्बै तथा ॥

पाटिरं शदुपत्तं काढं शदुपवस्त्रं तथा ।

“तत्काष्ठ” दलशोधनशोभ्यं काढम् ।

दशाइतुलं शदुपवस्त्रं तेन जिहा लिखेत् मुखम् ।

तच्छिह्ना मलवैरस्य दुर्गम्ब जडता हरम् ॥

Bhāva Prakāśa, I. i.

⁴ पापोपशमनं केशनखरोनापमार्जनं ॥

हृष्टलाघव-सौभाग्य-करमुत्साह चहनं ।

वाणवानं शजावर्णं तेजोवलं विवृद्धने ॥

Suśruta Saṃhitā, IV. xxiv.

तवादित एव नौचनखरोया * * *

Ibid.

⁵ पौष्टि कं हृष्टमायुष्यं शुचिरपविराजनम् ।

किञ्चमयुनखादीना ऋत्वनं संप्रसाधनम् ॥

Caraka Saṃhitā, I. v.

us to shave regularly, that is three in a fortnight.¹ Bhāvamīśra says that this practice conduces to health, beauty, longevity and purity, and should be observed every fifth day². Razor is mentioned in the R̄gveda³ and in the Kaṭhopaniṣad of the White Yayu.⁴ In the Śatapatha Brāhmaṇa, we find the method of shaving well described.⁵ "Then (in shaving) are used a porcupine quill spotted in three places and a copper razor; that three-spotted porcupine's quill resembles the three-fold science and the copper razor resembles the Brāhmaṇa; for Brahmā is fire, and fire is of reddish (lohitā) colour, hence a copper (loha), razor is used".

Again we read⁶ :—"For impure, indeed, is that part of man where water does not reach him. Now at the hair and beard, and at the nails the water does not reach him; hence when he shaves his hair and beard, and cuts his nails, he does so in order that he may be consecrated after becoming pure.

¹ विः पवस्तु किञ्चमद्युलोमनखान् संहारयेत् ।

Curakas Saṅkhiti, I. viii.

² पवरातावस्तु उम्मयुक्तिशरोमाणि करुयेत् ।

किञ्चमद्यु नखादीनो कर्तने सम्प्रसाधनम् ।

पीटिकं धन्वमायुषं' शीचकान्तिकरं परम् ॥

"सम्प्रसाधनम्" शीभाजनकम् ॥

Bhāva Prakāśa, I. i.

³ स नः गिरोहि भुरिजीरिव चूर्चराक्षरायो विमोचनः ।

R̄gveda, S. M. 4 S., 5 A., 7 A., 16 V.

⁴ चूर्चर धारा निशता दुरव्य दुर्बन्धस्तान् कवयो वदनि ।

Kaṭhopaniṣad, I. iii.

⁵ Śatapatha Brāhmaṇa, II. 6. 4. 5.

⁶ Ibid. III. 1.2.2.

3. Now some shave themselves all over, in order that they may be consecrated after becoming pure all over; but let him not do this. For even by shaving the hair of his head and his beard, and by cutting his nails he becomes pure; let him therefore shave only the hair of his head and his beard, and cut his nails.

4. In the first place he cuts his nails, first of the right hand, for in human (practice) those of the left hand (are cut) first, but with the gods in this manner. First he cuts those of the thumb—for in human practice those of the little fingers are cut first, but with the gods in this manner.

5. He first passes (the comb) through his right whisker—for in human (practice) they comb first the left whisker, but with the gods in this manner.

6. His right whisker he moistens first with the text "may this divine water be propitious unto me".....

Thereupon he lays a stalk of sacrificial grass on (the hair of the whisker) with the text "O plant, protect me"..... Thereto he applies the razor, with the text "O knife, injure him not".

8. Having cut off (part of the stalk and hair), he throws it into the vessel of water. Silently he moistens the left whisker; silently he lays the stalk of grass on it; and having silently applied the razor thereto and cut through (it and the hair) he throws them into the vessel of water.

He then hands the razor to the barber, and the latter shaves off the hair and beard. When he has shaved the hair and beard.....

10. He bathes.....

12. He steps out (from the water) towards the north-east, with the text "cleansed and pure I go forth from them;"

13. He then puts on (a linen) garment etc."

"The Atharva-veda relates how, when the ceremony of shaving off his beard was performed on king Soma, Vāyu brought the hot water and Savitṛī skillfully wielded the razor."¹

In para. 3, quoted above, we have evidence of the practice of depilation of the pubes which is here forbidden. There are six important rules and six minor rules of ordination for the female members or Śrāmaneris of the Buddhist order. One of the six minor rules is : A female must not shave the hair in any place but the head.² "Aristphanes, a contemporary of Hippocrates,³ Persius⁴ and Juvenal⁵ refers to the depilation of the pubes as being common among certain classes, and the early Christian Fathers deplore the practice. See also the remarks of Seutonius on the conduct of Domitian"⁶. Prosper Alpinus (16th century) "found the custom still prevalent among the Egyptian women"⁷. "The custom survived in France, and Italy in the 16th century"⁸.

KEŚA PRASĀDHANĀ OR COMB.

Suśruta directs us to comb the hair to free the head from dust,

¹ Macdonnel's Sanskrit Literature, p. 104.

² See I'Tsing, P. 97, Foot-note 3. Vinaya Saṃgraha. Chap. xii.

³ Hippocrates, Ban. 516, Lys 89, 151.

⁴ Persius, iv. 37.

⁵ Juvenal, vii. 114.

⁶ Seutonina, xxii.

⁷ Medicina Aegyptiorum, III. xv.

⁸ Miltue, Surgical Instruments &c., p. 90-91.

louse and dandruff.¹ Bhāvamīśra advises us to comb the hair every day to keep it clean, as it stimulates the growth of hair.² Caraka³ also recommends us to keep the hairs clean. The practice of combing the hair is very ancient; the Atharva-veda mentions a comb with a hundred teeth.

LOOKING-GLASS.

The looking-glass should be constantly used as thereby the complexion is said to be improved and life prolonged⁴. For an account of the looking-glass of the ancient Hindus, see Mitra's Indo-Aryans⁵.

DRESS.

Silk, chintz and red clothes are good for the winter, for they are said to be useful for derangement of air and phlegm. Thin silk is cooling and is efficacious for biliary disorders; so it should be used during the summer. It should be coloured twany or red. White clothes are auspicious and are neither hot

¹ किंश्चप्रसाधनी केशा रजीजन्तु मत्तापदा।

Sufrattā Saṁhitā, IV. xxiv.

² किंश्चपाचो प्रकुच्छैति प्रसाधना प्रसाधनम्।

केशं प्रसाधनं केशं रजीजन्तु मत्तापदम्॥

Bhāva Prakāśa, I. i.

³ साधुवेशः प्रसाधितकेशो * *

Caraka Saṁhitā, I. viii.

⁴ आदशोलीकर्णे प्रोक्तं साहस्रं कान्तिकारकम्।

दीषिकं वस्त्रमानुष्यं दायपत्रको विनाशनम्॥

Bhāva Prakāśa, I. i.

⁵ The Indo-Aryans Vol. I, p. 240.

nor cold; therefore they should be worn during the rains¹. Caraka says that pure dress conduces to longevity, happiness and fortune².

UŞNİSA OR HEAD DRESS.

Suśruta³ advises us to use a cap on our head which is thus protected from injury. Bhāvamīśra says that the habitual use of some form of covering for the head stimulates the growth of hair, increases beauty of the head and protects it from dust, draughts and accumulation of phlegm. Only light caps should be used as the heavy varieties derange bile and cause diseases of the eyes.⁴ For the diagrams of the various forms of turbans used by the ancient Hindus, see Mitra's Indo-Aryans.⁵

१ कोशीयौद्धिक वसन्त रक्षवस्त्रन्यैव च।
बातश्चेष्ट हरन्तु शोतकाले निधारयेत् ॥
“कोशीय” पदावरं वसरवस्त्रच ।
मध्यं मुशीतन्तिलङ्गं कषायं वस्त्रसुखाने ।
तत्त्वारयेदुच्चकाले तदापि लघु शस्त्रते ।
कषायद्वोकटी इलि लोके, कषाय रामरक्तं च ।
शुक्लं शमदं चक्रं शोतातपं निवारयन् ।
नवीन्यत्वाच शोतन्तु वर्षासु धारयेत् ॥

Bhāva Prakāśa, I. i.

२ काम्प' धशस्यनादुष्यमलक्ष्मीप्र' प्रहृष्यम् ।
शौभन् परिपदे शक्ते निर्बन्धाव्यरथारथम् ॥

Caraka Saṅhitā, I. v.
Bhāva Prakāśa, I. i.

३ पवित्र किशसुचौर्य बातातपरत्रोऽपहं ।

Suśruta Saṅhitā, IV. xxiv.

४ दक्षीर्ण छान्तिकान्तिक्षमं रजोवात् कफापहम् ।
लघु तत्त्वस्त्रे यज्ञाद गुरु पिताविदोगहन् ॥

Bhāva Prakāśa, I. i.

५ The Indo-Aryans, Vol. I, p. 220.

CHATRA OR UMBRELLAS.

Suśruta says: Umbrellas are useful for protecting men from the rains, draughts, glare of the sun, exposure to cold, and dust. They are auspicious and are beneficial to the eyes¹. Caraka² advises us to use it as it protects us from the sun, rain &c. Bhāvamīśra³ also describes its efficacy similarly. Umbrella is one of the insignia of royalty in India, and is always held over the heads of kings as shown in the Sanchi and Amarāvatī sculptures⁴. It is still commonly used in India.

YĀSTI OR STICKS.

Caraka⁵ directs us to use a stick as a support. Suśruta says: "By using sticks, a man gains in strength, prowess and manliness. He becomes courageous, patient and forbearing. He can stand erect and is not troubled by any fear"⁶. It

¹ वर्द्धनिलकौपयं हिमादीनां निवारणं ।

वद्य चक्रघ्नीजस्य शहरे दक्षधारणं ॥

Suśruta Saṃhitā, IV. xxiv.

² ईतिविधमने वल्ल' गुप्तावरथमहरम् ।

घर्षनिलकौपयुष्म' दक्षधारथमुच्चते ॥

Caraka Saṃhitā, I. v.

³ दक्षध धारणे वर्द्धतपवात रजीप्रहम् ।

हिमञ्जि हितमचाव माहस्यमपि कोर्तितम् ॥

Bhāva Prakāśa, I. i.

⁴ See Indo-Aryans, I, p. 266.

⁵ उल्लतः संप्रतिष्ठानं शत्रुघाव निस्तृणः ।

अवहननमायुरं भयञ्ज' दक्षधारथम् ॥

Caraka Saṃhitā, I. v.

⁶ यतः सरौसंपत्त्वात विवर्णिमोभवाप्यहं ।

शमवालन दोषद' स्वविरेच प्रसन्नते ॥

स्वस्त्रोक्ताइवलत्येष्य धैर्यवीर्य विवर्णनम् ।

प्रवर्षकरथापि भयञ्ज' दक्षधारणं ॥

Suśruta Saṃhitā, IV. xxiv.

protects a man from dogs, snakes &c. Bhāvamīśra¹ apparently quotes these verses from Suśruta.

UPĀNAHA OR SHOES.

The ancient Hindus used two kinds of shoes, made of wood and leather. The wooden pūḍukā is recommended to be used before and after dinner². The good effects claimed by its use are, an increase of the power of vision, strength and longevity.³ When travelling, the upānaha or leather shoes are to be used. Besides the advantages mentioned above, shoes are very comfortable to the travellers and prevent many diseases of the feet⁴. If any one often travels barefooted, he feels out of sort, his senses fail, vision becomes impaired and his expectation of life is reduced.⁵

¹ Bhāva Prakāśa, I. i.

² पादुकारोह्याद्युप्यत् पूडु भोजनतः परम् ।
पादरोग हरे इष्टं च चूष्यचायुषो हितम् ॥

Bhāva Prakāśa, I. i.

³ लघुष्यं स्पर्जनहिते पादवोद्दसनापठम् ।
बल्वं पराकमसुखं इष्टं पादवधारणम् ।

Caraka Saṃhitā, I. v.

⁴ पादरोगहरे इष्टं रक्षोऽप्तं प्रोतिवर्द्धने ।
सुखप्रचारमीजसे सदापादवधारणं ।
चनारोग्य मनाशुद्धं व्यायोरुपचारतङ्गत् ।
पादभासनुयानहातो सदा चंकमन्तं नृशो ॥

Suśruta Saṃhitā, IV. xxiv.

⁵ उपानहारणं नेत्रामायुषं पादरोगहर् ।
सुखप्रचारमीजसे हृष्व परिकीर्तितम् ॥
पादभासनुयानहातो सदा चंकमन्तं नृशो ।
चनारोग्य मनाशुद्धमिन्द्रियज्ञ लहर्णिदग् ॥

Bhāva Prakāśa, I. i.

The Hindus wore sandals like the ancient Greeks. They also used boots, which look like the modern boots used by Europeans. Buddha gave the Bhikkhus permission to wear boots or shoes, with thick lining¹. Hiuen Tsiang² says that "here (Avanti) Tathagatha gave permission to the Bhikkhus to wear kih-fu-to (boots)." For an account and figures of ancient boots used by the Hindus, see Indo-Aryans.³

VYĀJĀNĪ AND CĀMARA. THE FAN.

The fan was used for airing the patients to drive away flies.⁴ Suśruta mentions the cāmara *i.e.*, the tail of the Thibetan yolk (*Bos grunnius*) to be used as a fan. "It soothes the inflammation of boils and also acts as a fly-brush to prevent infection of the open wound"⁵. The cāmara is also one of the insignia of royalty and as such we have many representations of it in the sculptures of ancient India⁶. For diagrams of the ancient fan, see Indo-Aryans⁷.

Caraka directs us to use a kulā or fan to winnow corn, prepared from the kāśa (*Saccharum Spontanum*) to resuscitate a still-born child⁸.

¹ *Mohāragga*, varga 13 ff 6. S. B. E. vol. xvii, p. 35.

² Beal's Records of Buddhist Religion, vol. II, p. 250.

³ Indo-Aryans, Vol. I, p. 123-8.

⁴ वालव्यजन भौत्रसं मचिकादीनपोहति ।

गोपदाह चमस्तेद मूळात्रो अजमानितः ॥

Suśruta Samhitā, IV. xxiv.

⁵ अन्येत् वालव्यजनेऽसं न च विषट्येत् ।

Ibid., I. xix.

⁶ See Indo-Aryans, vol. II, p. 267-70.

⁷ For diagrams, see Indo-Aryans, vol. I, p. 263.

⁸ तथा स्त्रेशवितानं प्राणान् पुरलैमेत लभकपालिकाग्रं प्रथा देनमधिनिषुनीयाद्-यथेद्य आत् यावत् प्राणान् प्रथागमनं तत्त्वमर्थमेवकुर्याद् ॥

Caraka Samhitā, IV. viii.

Bhāvamīśra¹ mentions fans made of the following materials:—palm leaf, bamboo, yolk's tail, cloth, peacock's feather and cane. He attributes peculiar properties to each fan.

Rājavallabha says² that “the palm-leaf fan overcomes disturbances of all the three humours, and is light and agreeable; the bamboo fan causes heat and irritability, and promotes inordinate secretion of the two humours—air and bile; the cane, cloth and peacock's feather fans, overcome disturbances of the three humours; the hair fan is invigorating etc.”

The Buddhist Bhikṣus used the palm-leaf fan. “Not unfrequently there is added a lotus-leaf shaped fan, made from a single frond, with an edging of bamboo or light wood, and furnished with a handle fashioned like the letter “S”. The palm frond from which the leaf is taken, is also that used for the mss., namely the Talipot; hence the name Talponi given to the Bhikkhus by the early Portuguese adventurers in Burma. When he attended a meeting at which women are likely to be present, every Bhikkhu must have the fan.”³

* व्यजनसामिको दाह रवेदमूर्च्छा यमापहः ।
तालहनभयो वातलिदोषशमको भतः ॥
वैश्वजनजन्मुच्छो रक्षपित्रप्रकोपकः ।
चामरो चक्रमधूतो माघरो विवजन्मथा ॥
एते दोषजिता वाताः शिर्था हृदा: सपूजिताः ।

Bhāva Prakāśa, I. i.

* तालव्यजनगुणः—विदीषशमनत्वम् । लघुत्वसः ॥ वैश्वजनगुणः—क्षेत्रत्वम् ।
वातत्वम् । वायुपित्रकारित्वसः ॥ विवषकमयूरपृच्छाव्यजनगुणः—विदीषनाशित्वम् ।
वातव्यजनगुणः—तेजस्तरत्वम् । मधिकादि निवारकत्वसः ।

Rājavallabha.

¹ The Way of Buddha, p. 53-54.

FILTERS.

Filters were used by the Hindus and are recommended to be made of an earthen or metallic vessel, the mouth being closed by a piece of cloth tied round its neck.

If the water be filthy, Suśruta¹ advises us to purify it by boiling it or by exposure to the sun; or by throwing hot iron balls, sand or clay balls into the water and then allowing it to cool. Such purified water should be scented with the flowers of Nāgakeśara (*Mesua Ferrea*), Campaka (*Michelia Champaca*), Utpala (*Nymphaea Stellata*) and Patala (*Bignonia Sanguineola*).

Suśruta mentions seven means of purifying polluted water², viz.,

1. Kataka phala or nirmālāya or seeds of *Strychnos Potatorum*.
2. Gomedaka or a kind of gems.
3. Viṣagranthi, or root of *Nelumbium Speciosum*.
4. Saivālamūla or root of *Vallisneria Spiralis*.
5. A piece of cloth.
6. Pearls.
7. Precious Stones and crystals.

¹ व्यापद्रानामधिकयने सृष्टातपतापनं नदादःपिण्डसिक्तालोडायां चा निर्जापनं प्रसादनस्त्र ऋग्नं नामचम्पकोत्पलपाठस्त्रापुष्पप्रभृतिभिष्याधिकासनमिति ।

Suśruta Samhitā, 1. xliv.

² तत्र सप्तकलुपस्त्रं प्रशाखानि भवन्ति । तद्यथा । कतकगीर्भेदकविषयजिश्वालमूल-वचाणि सुकामणितेर्ति । पाचनिकेपक्षानिभवन्ति । तद्यथा । फलक्ष्मी व्याटकं सुखवल्य उदकमस्तिकागिकादेति । सप्तशीतिकरणानि भवन्ति । इवातस्यापनमुदकप्रयोगं शटिकाभास्त्रं अजने वस्त्रोऽपरम् । वालुका प्रयोगं शिक्कावलम्बनदेति ।

Ibid.

He mentions five kinds of means for preventing contact of the water vessel with the earth¹ :—

1. Phalaka or planks as of Śālmali wood.
2. Tryastaka or octogonal tripod of wood.
3. Muñjvalaya or circular pad of Saccharine Muñja.
4. Udagamañcikā or a raised framework of cane and bamboo.
5. Śikya or a loop suspended by three strings.

He mentions seven ways of cooling water :—

1. Exposure to air.
2. Sprinkling water on the vessel.
3. Stirring the water with a rod.
4. Fanning the water.
5. Filtration through cotton fabrics.
6. Putting the vessel of water on a sand bed.
7. Suspension of the vessel in a loop.

He advises us to use rain water filtered through a broad piece of white and clean cloth². In collecting water from the rivers and ponds, the Hindu females still use a kalasī or earthen vessel, the mouth being closed by a piece of cloth.

¹ In the English translations of the Saṃvara Saṃhitā, Bibliotheca Indica, Dr. Catopadhiya translates the passage incorrectly. He misunderstood the terms phalaka, &c. to be remedial agents, necessary in the purification of water.

* शाहुः पुनः प्रथानं तद्याददीतावयुजे नाभि शूचिष्ठवित तपटेकदेश्चात्मय वा हर्म्यातलपरिभृमन्तेष्ठा शूचिभिन्नाजनेष्ठ दीतः ।

Suśruta¹ deprecates impure water as injurious to the human system and advises us not to drink or bathe in such water as there is always the risk of being speedily affected with many diseases.

"It (filter) forms one of the eight sacred utensils necessary for a sramana of the Buddhist order. It is a strainer or water-dipper—an apparatus for filtering the water which he drinks, so that he may not, even unwillingly, take animal life"²

One of the six requisites of a Bhikṣu is Parisrāvana, a water-strainer³.

WATER VESSEL.

To store water, Suśruta mentions vessels of gold, or silver, or earth⁴.

"The clean water is kept separately from water for cleansing purposes (*lit.* 'touched' water), and there are two kinds of jars (*i.e.* kundi and kalasa) for each. Earthenware or porcelain is used for the clean jar, and the jar, for water for cleansing purposes (*lit.* touched water) is made of copper or iron. The clean water is ready for drinking at any time, and the 'touched' water for cleansing purposes after having been to the urinal.

व्यापकं वर्जयेति वै गोप्यं ददाष्यनात् च ।
दोषसङ्करनं हीतदाददीताहितनु तत् ॥
व्यापकं सलिलं दम्भु प्रिवतीहा प्रसाधितं ।
दद्यु पात्रुरोगच लवदोषमविषयाकातां ॥
शासकासपतिशापयज्जग्निदराजि च ।
अन्यान् वा चित्रमान् रोगान् प्राप्त्यात् चिप्रभेदच ॥

Suśruta Saṃhitā, I. xlv.

¹ The way of Buddha, p. 53.

² I^tsing, ch. x.

³ सौवर्णं राजते मन्मये वा पात्रे निदध्यानं सक्षार्चकालमुपयुक्तौ तस्मानामि भौमम् ।

Ibid.

The clean jar must be carried in a clean hand, and be placed in a clean place, while the jar for the 'touched' water should be grasped by the 'touched' (or 'unclean') hand and be put in an unclean (or 'touched') place. The water in a pure and fresh jar can be drunk at anytime; the water in any other jar is called 'special water' (more *lit.* seasonable water *i.e.* water to be used at certain prescribed times, probably *kālodaka*).¹

BATHING.

The Hindus in their daily life do not eat without having first washed themselves in a bath. They always use a bathing-sheet and this ancient practice is still followed.

Bhāvamīśra says² : "Bathing stimulates the appetite, virile power and strength, prolongs life, allays thirst and burning sensation, cures eczema, and washes out dirt and perspiration."

Besides the ordinary bath, there is some evidence of the use of a medical bath to cure diseases. I'Tsing says³ : "The World-honoured One taught how to build a bath room, to construct a brick pond in an open place, and to make a medical bath in order to cure a disease. Sometimes he ordained the

¹ I'Tsing, ch. vi.

* दौपने हथमात्युष्मा सान्न मोजो बलघदं ।
कर्षुमलवसःस्वेदतन्द्रा लव्दाह पापनुन् ॥
वाह्युष सेको शीतायै कमानवांति पीकितः ।
नरस्य सातमाचस्य दीप्तये निन पावकः ॥
शीतेन पवसा साते रक्तपित्तप्रशालिङ्गतः ।
तर्देवीचेन तोयेन वस्त्रं बातकफापहम् ॥
शिरः सानमवस्थ्य मनुष्णेनानुना सदा ।
बातग्रे ग्रे प्रकोपेतु हितनय प्रकीर्तितम् ॥

Bhāva Prakāśa, I. i.

² I'Tsing, ch. xx.

whole body to be anointed with oil, sometimes the feet to be rubbed with oil every night, or the head every morning ; for such a practice is very good for maintaining clear eyesight and keeping off the cold." "Bathing should always take place when one is hungry. Two kinds of benefits are derived by having meals after bathing. First, the body is pure and empty, being free from all dirt, second, the food will be well digested, as the bathing makes one free from phlegm or any disease of the internal organs. Bathing after a good meal is forbidden in the 'Science of Medicine'" (Kikitsā-Vidyā).

DRINKING VESSEL.

Scented water is advised to be drunk out of cups made of gold, or silver, or copper, or bell-metal, or lapis lazuli or earth.¹ Bhāvamiśra² also mentions cups of the same materials.

"To drink from a jar holding it upright in front is no fault ; but drinking in the afternoon is not permissible. A jar must be made to fit one's mouth ; the top of the cover should be two fingers high ; in it a hole as small as a copper chopstick is made.

Fresh water for drinking must be kept in such a jar. At the side of the jar there is another round hole as large as a small coin, two fingers higher than the drinking-mouth. This hole is used for pouring in water ; two or three gallons may be put in it. A small jar is never used.

¹ See foot-note 2, P. 65.

² जलपातन् तालस्य तदभवेभवीहितम् ।

परिते शौतन्न पात्रं गतिरेष्टिकेन यत् ॥

काढेन रचितनाइतया वेद्यं सञ्चयम् ।

If one fear that insects or dust may enter in, both the mouth and the hole may be covered by means of bamboo, wood, linen, or leaves. There are some Indian priests who make jars according to this style. In taking water the inside of the jar must be first washed in order to get off any dirt or dust, and then fresh water must be poured in.

A priest who travels, carries his jars, bowl, necessary clothes, by hanging them from shoulders over his cloak, taking an umbrella in his hand. This is the manner of the Buddhist priests in travelling¹.

DINNER SERVICE.

Suśruta² advises us to use different kinds of vessels for distributing the various kinds of food :—

Iron vessels for ghee or clarified butter.

Silver vessels for drinks, soups and gruels.

¹ I'Tsing, ch. vi.

² वृत्तं काण्डामधसे देयं पेया देयातु राज्ञत् ॥
कलानि सञ्चमद्यांश्च प्रदशाऽदलिषु च ।
परिषुक्प्रदिक्षानि सौवर्णेषु प्रकल्पयेत् ॥
प्रद्रवाणि रसायेष्व राज्ञतेषु पहारयेत् ।
कटुराणि खडां देव सम्बोन् शेलिषु दापयेत् ॥
दद्यात्तासमर्थं पात्रे सुशीतं सुभर्तं पथः ।
पानोद्यं पानकं नद्यं सन्धरिषु प्रदापयेत् ॥
काचक्षिकपात्रेषु गौतमेषु शमेषु च ।
दद्याऽदूर्यपात्रेषु रामपाडवस्तुकान् ॥
पुरकाविमले पात्रे सुविक्षीर्णं भनीरमे ।
मृदः सुर्पीदने दद्यात् प्रदहाण्य सुसंकृतान् ॥

Plantain leaf vessels for fruits and sweetmeats.

Gold vessels for flesh.

Stone vessels for whey.

Copper vessels for milk.

Earthen vessels for water, sherbets and wines.

Glass, crystal, lapis lazuli vessels for rājśājava and saṭṭaka.

In the Bhāva Prakāśa¹ we have a detailed description on the subject—"A dinner service of gold is the best from a medicinal point of view, and it is supposed to be the best tonic for the eye. Eating out of silver is equally efficacious for promoting hepatic functions. A service of zinc improves the intelligence and appetite. Food served in brass utensils promotes wind and heat, but cures phlegmatic disorders and expels worms. The use of steel or glass vessel cures chlorosis, jaundice and intumescence. A stone or clay service brings on poverty. Wooden plates are good appetisers, but help the secretions of phlegmatic humour. The use of certain leaves as plates acts as an antidote against poisons. When at dinner, a water jug with a cup should be placed on the right hand. A copper vessel is the best for the purpose. The next best is an earthen pot. Vessels made of crystal and lapis lazuli are also pure and cooling".²

¹ आवस्ति कान्पात्रे च भोजने सिद्धिकारकम् ।

गोथं पाण्डुहरं वल्लं कामलापहसुषमम् ।

शैलिये शत्रुघ्नये पात्रे भोजने शीनिवारकम् ।

दाक्षिण्ये विशेषिण्ये कचिदद्वये भक्तारितु ।

पात्रं पत्रसर्वं कथं दीपने विषयापत्तुत ॥

SPOONS.

I¹Tsing says¹: "As to the mode of eating in the West, they use only the right hand, but if one has had an illness or has some other reason, one is permitted to keep a spoon for use."

SPITTOONS.

Spittoons were commonly used by the ancient Hindus, and Caraka² mentions it as one of the things necessary for the sick room. It is also mentioned in the *Mohāvagga*³: "And the sethe's wife spat it out into the spittoon." Fa-Hian⁴ noticed a "stone spitting vessel in this country (Kie-sha) belonging to Buddha."

BEDPANS AND URINALS.

The bedpan and urinal were also used by the patients in ancient times. Caraka mentions them to be necessary in a sick room.⁵

PUS BASINS.

Metallic basins marked with different measures were used for holding discharges after operations. In the *Aśvavaidyaka*⁶

¹ I¹Tsing, ch. xvi.

² लोपन्यस्तमाहार प्रतियहारि ।

* * * *

प्रतियहारीपचार्येत् ॥

Caraka Saṃhitā, I. xv.

³ Sacred Books of the East, VIII, i. II.

⁴ Beal's Records, vol. I, Introduction, xxviii.

⁵ See Page 36 and foot-note 1, P. 34.

⁶ परदेशी लोमशे निव्यं लोमानुपाद्य विधयेत् ।

प्रमाणाच्छ पातेष रक्तं स्फङ्गाति उडिमान् ॥

Aśvavaidyaka, XV. verso 30.

blood let out in the operation of phlebotomy, is recommended to be collected in a basin, so that the quantity may at once be determined.

PESTLE AND MORTAR.

Pestle and mortar are mentioned in the R̄gveda for preparing the Soma juice.¹ And their use in pharmacy was well-known to the ancients.

Besides the pestle and mortar of pharmacy, we find mention of a large wooden pestle used in reducing dislocation by Suśruta.² Caraka says that two pestles and motars should be kept in a lying-in-room, the object being to allow the woman some kind of work; and then she will not lie down idly on her bed if there be any delay in the delivery of the child³. Suśruta also recommends it⁴. “The mortar (ulukhala) and pestle (muṣala) are to be made of very hard wood, viz., both of Varana wood (Crataiga Roxburghii), or the mortar of Palāśa wood (Butea Frondosa), and the pestle of Khadira wood (Acacia Catechu). The former

¹ उलूखलमुतानामवेदिं अन्यतः ॥

* * * *

यथिहि त' यहं सद उलूखलक यज्ञसे ।

R̄gveda, 1 M. 28 S. 1 A. 2 R.

² See foot-note 6, P. 172.

³ See P. 30, and foot-note 1, P. 40.

सा चेदारीभिः संक्षिप्तानाना न प्रजावेताथेनो ब्रूयात् उतिहमूपलमवतरङ्गं स्टडीचानेतदु-
दृखलं धान्वपुणे महामृहरधित्रिः सुहम्भृहरवज्ञापस चंकमस चानशानात् इत्येवमूपदिग्दर्शकः ।

Caraka Saṁhitā, IV. viii.

⁴ काजातीतस्याविनि गम्भ विशेषतः सधान्वमूद्धलंमूषलेनाभिहन्वादिप्रमे वा यानामने
संवेत ।

is to be of the height of the knee and the latter three aratnis (cubits) long¹."

On the inner face of the left pillar in the eastern gate of Sanchi Tope, there is a beautiful representation of a kitchen scene, in which the ancient mortar and pestle are shown. "The mortar and two-handed pestle same as those in use at the present day in India. The mortar (okhli) is exactly the same as the Greek *γύψη*, and the Roman *pila*; and the pestle (musar) is the same as the Greek *Kόταρος*, and the Roman *pilum*"²

The pestle and mortar used in pharmacy was called *asmabhālam*. It is still used to pulverise medicaments, and is made of iron or brass.

In the *Mahāvagga*³ we find a reference to the pestle and mortar. "I allow, O Bhikkhus, the use of a chunam as a medicine by whomsoever has the itch, or boils, or a discharge or scabs, or whose body is ill smelling, and to those in health the use of dry dung, and of clay, and of coloring matter. I allow, the use, O Bhikkhus, of a pestle and mortar" (*udukhalam nusalāñ ka*).

SIEVES, STRAINERS AND FILTERS.

There is evidence that cloth sieve was used by the Hindus in ancient days, we find it mentioned in the *Rgveda*⁴. The purpose of straining and filtering solid and liquid medicines respectively is mentioned to have been served by two or

¹ Schol. on Katy. 1.3.3.6, footnote, *Śatapatha Brāhmaṇa* (Sacred Books of the East, 1.14.8.)

² Cunningham's *Bhilas Topes*, p. 207.

³ *Mahāvagga* VI. 9. 2.

⁴ *Rgveda*, 10m. 71a. V 2

three layers of a piece of cloth. And we know that in the prehistoric Soma rites, it "was pressed, passed through a sieve, mixed with milk, and offered as the main oblation".

The reference to a cloth sieve, we find in *Mohāvagga*¹: "Now at that time the Bhikkhus who were sick had need of sifted chunam as medicine."

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a chunam sieve".

They had need of the chunam very fine.

"I allow, O Bhikkhus, the use of a cloth sieve".

Pavitra was used in the Vedic times². It was a filter. Wilson translates it: "Through the purifying filters".

COLD AND HOT APPLICATIONS.

To relieve colic pains, vessels made of silver, copper or precious stones, containing cold water, are directed to be placed upon the part or better upon the navel³. Besides these, leather vessels containing cold water are also directed to be used for reducing the temperature in dilirium tremens.⁴

¹ *Mohāvagga* VI. 10. 1.

² सप्तः पुनानाः कविभिः पवित्रैर्द्युमिहिं लंबत्वा मिष्टनीः ॥

Rgveda, 3m. 31s. 16 Rk.

संगुं दृश्यन्ति हलिनो भरितेऽस्मद् पुनर्नि धारया पवित्रैः ॥

Ibid., 3m. 36s. 7 Rk.

³ मणिराजत तामानि भाजनानि च सर्वज्ञः ।

वारिपुष्कानि तान्वस्य शब्दस्योपरि निचिपत् ॥

Saṃskṛita Saṃhitā, VI. xlii.

⁴ हिमराजत कस्त्रिनां पावाणो ग्रीतवरिभिः ।

पूर्णोनां इमपूर्णनां डतानां पवनाहताः ॥

Carmaka Saṃhitā, VI. xii.

Heat is directed to be applied to the patient's body in various ways¹ :—

I. Tāpasveda :—palm of the hand, brass dish, sand, cloth, potsherd &c. are the means mentioned for applying heat to the body.

II. Uṣṇasveda :—potsherds, stone, bricks, or iron balls are to be heated to redness and then water is to be sprinkled upon them. The part to be fomented is covered by a wet piece of thick lint and then the heated materials are to be applied over it. Or heat may be applied by means of a narrow vessel containing hot decoctions. The vessel is to be surrounded by a piece of

¹ चतुर्विधः स्वेदकाद् यथा । तापस्वेद उच्चस्वेद उपनाहस्तेदीद्रव स्वेद इति ।
अत संज्ञस्वेद विकल्पाद्यरोधः ॥

तद ताप-स्वेदः । पाति कांसकन्दकपाति वालुकावने: प्रयुज्यते शयानस्थानाङ्गासारी वृक्षः
खादिराज्ञारैरिति । उच्च-स्वेदस्तु कापाल पाषाणेटकालौह-पिण्डानश्चिवर्कामङ्गि रामिदेद्यु
द्वयेवति रादालक्तक परिवेष्टितमहू-प्रदेशं स्वेदयेत् । मास रस पयोदधि धात्रास्त्वातहर
पयभङ्गाकाश पूर्णां वा कुम्भोमनुत्पानं प्राप्तवीप्तार्थं स्तडीयात् । पार्व फिद्रेण वा कुम्भोनाथो-
मुखेन तथा मूष्मनमिसन्नाय तथान् किंत्र हन्ति गुण्डाकारां नाडीं प्रशिखाय तम् स्वेदयेत् ।

सुखोपविष्ट स्वभृतः युक्त प्रावरकाहर्त् ।

हमितुचित्तिक्या नादा स्वेदस्येदात्-रीतिर्ण ॥

सुखै सञ्चार्जन्नाप्नो द्वाषा नवं क्लिश्याति सानवे ।

व्याघांसामावा तिरक्ता हन्ति हन्ति समाज्ञतः ॥

स्वेदनार्थं हिता नाडी कैलिष्ठी हमी गुण्डिका ।

* * * * *

उपनाह स्वेदस्तु वातहरमूलक अन्तर्ब्रह्म पिण्डेत्वा प्रगाढः सुखिन्ते: सुखोर्णोः प्रदिक्षा
स्वेदयेत् । एवं काकोल्कान्तिभिः सरसादिभिस्तिलालभौ भर्त्यप कन्कैः लक्षणा पात्रसोत्कारिका-
भिर्वैसवारैः शालगैर्ज्ञानवस्त्रावनहैः स्वेदयेत् ।

इत्र स्वेदस्तु-वातहर द्रव्यकाश पूर्णे कीच कटाहि द्रोग्यां वातमात्रा स्वेदयेत् । एवं पयोमसि-
रम-पूष-तेज-धात्राद्य-शृण-वसा मृद्देशवर्गाहृत सुखोर्णोः कवायै परिविचेदिति ।

Safruta Saṅghitā, IV, xxxii.

cloth to prevent the skin from being burnt. Or heat may be applied by the following device:—an earthen vessel or kalasi containing hot decoctions is to be closed; and the vessel is then to be inverted. Then a hole should be bored on its side, and a tube shaped like an elephant's proboscis is fitted to it; the vapour issuing from the tube is allowed to play on the part.

To apply vapour bath:—put the hot infusion of medicinal substances into an earthen vessel and close its mouth. Drill a hole into the side of the vessel and adapt a tube to it. The tube may be either metallic or wooden. The tube should be two hands (forearm and hand) long and made of three pieces; the end of the tube which should taper like a cow's tail must be six anguli long. The patient should be seated on a stool and well covered with cloth. The tube is then introduced inside the blanket, and thus the issuing vapours heat the whole body. (*Sāringadharā*¹).

Suśruta says that the tube should be half byām (*i.e.*, the distance between the two hands when extended) long, bent thrice and shaped like an elephant's proboscis. Sometimes a large stone slab is to be heated with burning wood of *Aenacia Catechu*. Then after removing the ashes, the patient is directed to lie upon it. A tent or cloth-cover having four doors is sometimes required for the patient to sit in, and heat is applied by burning wood outside it.

¹ अद्यवा चातनिनोग्निद्रव्यकावरसादिभिः ।

चूचेवंटं पृथिव्या पाते' किङ् विधाय च ॥

विमुद्रापाते विस्त्रयात्प चातनो काहजो तथा ।

षड्हृतास्तो गोपुक्तो नाडी मुद्रात् दिहसिको ॥

मुखोपविष्टं स्तम्भं' गृहप्रावरकावतम् ॥

इत्तोद्यन्तिकया नात्या न्देदयेकात्तरेणिष्यम् ॥

Sāringadharā Saṅgraha, III. ii.

III. Upānabasveda or poultices :—roots of medicinal plants are to be pressed and formed into a paste with mustard, sesame etc. This is to be heated, put on a thin cloth and so applied.

IV. Dravasveda or hot bath :—the patient is to sit in a tub or vessel of hot water. Iron pails or tubs are recommended to be used by patients to take bath in some infusions. Śāṅgadhara says¹: The tub (droṇī) should be made of gold, or silver, or copper, or iron, or wood. The height and length of the tub should measure thirty-six aṅguli each. When the patient sits inside, the height of water should stand six aṅguli above the navel. A droṇī filled with oil is to be used for placing an unconscious patient in it to overcome the shock caused by fall, blows, fractures and other injuries.

Cakradatta² describes the four methods of applying heat, Bhāvamīśra also describes them similarly³. Hārita, however, mentions seven methods of heat-application⁴.

१ नोबणे राजते वायि तामसादसच दाक्षतम् ।
कोहकं तथ कुर्वन्तोऽक्षये पट्टिशद्भूलम् ॥
आयामेन तदेवस्याबतुक्षे महत्त्वं तदा ।
नामः वडङ्गुलं यावन्नप्यः कायस्य धारया ॥

Śāṅgadhara Saṅgraha, III. ii.

२ तथः सैकतपाणिकोऽन्वयनेः स्वेदाऽयवाङ्गारक-
र्लपाहातहरैः सहाय्यत्वस्त्वेतैः सुखीचेम्बेत् ।
एवं तमपयोऽन्वयातग्नेनकायादिसिकादिभि-
क्तात्सोयनियवचनोऽवहङ्कारः गिलादेः क्रमात् ॥

Cakradatta, Svedādbikāra.

३ स्वेदशतुर्विधः प्रोक्तक्षापोष्ठस्वेदसंशितः ।
स्वपनाहो द्रवः स्वेदः स्वेदं वातानिंहरिषः ।
तापस्वेद उद्धर्मवेदय ताभ्यां संशितः ।

Bhava Prokāśa, I. i.

४ स्वेदः सत्रवितः प्रोक्तो लोटस्वेदो वायस्वेदोऽग्निज्ञातास्वेदः ।
घटस्वेदो लकडस्वेदो फलस्वेदो वानुकास्वेदः ।

Hāritā Samhitā, V. 47.

BALANCE OR MĀKADĀNDĀ.

For weighing medicinal substances, the scales and balance are often mentioned. They mention a set of weights and measures to be used in weighing substances. Alberuni¹ describes the Hindu balance thus:—"The balance with which the Hindus weigh things, are *χαριον τιμωρες*; of which the weights are immovable, whilst the scales move on certain marks and lines. Therefore the balance is called tūla. The first lines mark the unit of the weight from 1 to 5, and further on to 10; the following lines mean the tenths, 10, 20, 30, &c. In Fergusson's Tree and Serpent Worship we have a diagram of steel-yard, where a man is represented as stepping in the scale, apparently to weigh himself². The ordinary balance is still in common use amongst the kavirājēs of the present day.

COLLYRIUM POTS.

The Hindus used to apply collyrium to their eyes, from a very early time. It is said to stimulate the growth of eye-lashes, brighten the lustre of the eye-balls and clean the pupils.

Bhāvamīśra³ recommends us to use collyrium as it improves the visual power and cures many diseases of the eye. It is

¹ Alberuni's India. Trans., by Sachau, vol. I, p. 146.

² The Tree and Serpent Worship, the pl. ixiii, fig. I.

³ पद्मलं विशदं कामलमसोऽनुलू भवतुः ॥

नेत्रमहून मयोगादभवेत्प्राप्तं तारकं ।

Suśrāta Saṁhitā, IV. xxiv.

* सौबीरभङ्गं निव॑ कितमकाशतो भजेत् ।

लोचने भवत्सेन भवोऽश्च सूक्ष्मदर्शने ॥

“द्वीपोद्धृते” वेत सुरमा इति लोके प्रसिद्धम् ।

सोतीष्ठ्राने भर्त चेष्ट विशदं मिथुसच्चरम् ॥

contra-indicated in patients suffering from fever, emesis, exhaustion, &c.

Suśruta mentions collyrium pots of different metals intended for different kinds of collyrium then in use—

gold	pots	for	sweet	collyrium.
silver	pots	for	acid	collyrium.
horn	pots	for	salt	collyrium.
copper & iron	pots	for	astringent	collyrium.
lapis lazuli	pots	for	sour or acid	collyrium.
bell-metal	pots	for	bitter	collyrium.

He also mentions pots of ivory, or crystal, or coral, or horn, or conch-shell, or stone, or gold, or silver¹.

He also mentions a piece of bamboo for storing collyrium². A bamboo is still used by the poor for keeping oil in India. For a similar purpose the wood of Khadira (*Acacia Catechu*) is also

देष्टः कर्मनलहरं दाहकेदं वज्रपहम् ।

अलोकया इह वै सहनेभावतात्पौ ॥

नेत्रवीरा न जायन्ते तथा दाक्षान माचरिण् ।

“आतोऽधर्म” कर्मनलहर इति लोके प्रसिद्ध ॥ “विशुद्ध” गोधनं विनापि ।

“सिन्धुसूच्यवम्” सिन्धुनाम पर्यंतसाच सूच्यवम् ।

रात्रौ जागरितः जानः इदिनो भुक्तवक्तव्या ।

ज्वरात्मः प्रिरक्षात्मी नाकोरक्षनमाचरेत् ।

Bhāva Prokāśa, I. i.

¹ See foot-note 3, P. 67.

² कुलकांगोकशालासपियहृनलिनोत्पलैः ॥

पुर्वेरेणुक्तात्पात्रापात्रामलक संयुते ।

सप्ति सप्तुतै युक्तं तण्डनादामवस्थितैः ॥

recommended¹. For storing oil, Drīhavala² mentions the use of vessels of stone or the horn of a lamb or iron.

MEDICINE GLASS.

Sukti or shell of mussell was used as medicine glass. The shell of the fresh water mussels unionacea is mentioned to be used for holding a dose of medicine for administering it to a patient³. They generally have equivalve, though not equisided, shells which are covered externally with a smooth brown epidermis and internally by a mother-of-pearl layer. Such a shell "is said to have been formerly much used in England by painters for holding their colour and so the commonest variety is termed unio pictorum. To apply oleaginous errhines, Suśruta⁴ recommends us to use metallic pots or the shell of mussel. It is still used in India for feeding the babies with milk and also for administering medicines to the patient. Heyne⁵ (1814) says that "according to the nature of the disorder, the medicines should be taken out of gold, silver or brass vessels. But if these should not be at hand you may use iron or even earthen vessel."

१ संस्कृतप्रिहितं युक्ताद्विहितं वेलकरे ।
मेदीयकदशृतवाऽपि पिण्डल्यः सम्बन्धमधु ॥
रसमामलकवापि पक्ष' ममद् निरापदेत् ।
कोशे खुदिरनिर्भागे तदत् शाढाङ्गे हितं ॥

Suśruta Saṃhitā, VI. xvii.

¹ See foot note, 4, P. 67.

² तत् उपसंख्युतश्चरोरः प्रातः प्रातकल्पाव याचियुहिमात् लौटेष एतिसंस्कृतोपयुक्तीतः ।
Suśruta Saṃhitā, IV. x.

³ वास्तव्य प्रदेशिना योद्धाभितनालालाय विश्व कोतसि इविष्य हस्तेन क्षेत्रसुशान तता रजत सुवर्णं तामन्तपाव गुलिमामन्तमन च गुला पितुमा वा मुखोच्च' च इमद्रुतमासिकेद अवच्छिन्धारं यथानियेन प्राप्तोति ।

Ibid. IV. xi.

⁴ Dr. Heyne's Indian Tracts,

DROPPER.

The Hindus used a tent of cotton as a drop conductor. Cakradatta¹ advises us to drop medicines into the eyes thus:—the patient should be made to lie down in a place free from draught; the surgeon is to open his eye with the left hand, while with the right, he allows 10 or 12 drops of medicine to fall from a height of two aṅguli on the eye from a tent of cotton, immersed in medicine contained in a clean vessel.

GRIND-STONE.

Grind-stone to pulverise medicaments is mentioned. In the Mahāvagga² we find a reference to it. "I allow, O Bhikkhus, the use of a grind stone, and of another stone to grind upon" (pisana-silā ka pisana poto ka—Buddhaghosha).

STONE AND IRON MULLER.

For similar purpose a stone slab and iron muller are necessary to make pastes and powders of medicines. On the inner face of the left pillar in the eastern gate of Sanchi Topes, the kitchen scene is represented, in which "a fourth woman is seated grinding spices or condiments on the sil, or flat stone, with a bant or round muller"³.

KHAI, OR ELLIPTICAL MORTAR OF STONE AND PESTLE.

To prepare medicines to be exhibited to the patients, a small

¹ निवातस्त्रश्च वर्मन यायिनीच्छोल्ल लोचनम् ।

गङ्गाप्रस्त्रव्याघ्रेन पितृवर्णा कर्मोनिकैः ।

दण्ड दादण वा विन्दू वार्षुलादवसेचयैत् ।

Cakradatta, Āśotasyayūdhana Adhikāra.

² Mahāvagga vi. 3.2.

³ Cunningham Cunningham's Sanchi Topes, p. 200.

elliptical mortar is generally used when the medicines require to be thoroughly mixed with some excipient.

The following appliances, besides those mentioned before, become necessary in pharmacy :—

1. Iron pails of various sizes.
2. Vessels of iron, copper, silver, brass and earth for storing medicines.
3. Spoons of wood or darvi; large metallic spoon or bata.
4. Iron sandāñśa or pinchers.
5. Rods of wood or iron.
6. Blacksmith's bellows.
7. Ankuśa or hooks like the elephant driver's goad.
8. Iron hammer.
9. Earthen crucibles of different sizes.

CHAPTER IX.

THE CONCLUSION.

In the recent edition of the System of Medicine, Prof. Albutt¹ begins his article on the History of medicine with the following observations : "The medicine of Egypt and the East, extensive and intricate as it was, in so far as it was not Greek did not contain even the rudiments of science. To it Western medicine owes virtually nothing, and in this article at any rate, it may be disregarded". Prof. Osler² also speaks in the same strain : "Crude and bizzare among the primitive nations, these ideas of disease received among the Greeks and Romans a practical development worthy of these peoples. There have been systemes of so-called divine healing in all the great civilizations, but for beauty of conception and for grandeur of detail in the execution, all are as nothing in comparison with the cult of the son of Appolo, and of Aesculapius, the god of healing." "Scientific medicine, the product of a union of religion with philosophy, had its origin in a remarkable conjunction of gifts and conditions among the Greeks in the sixth centuries".

Such opinions remind us of an assertion of Sir William Jones³ "that there is no evidence that in any language of Asia there exists one original treatise on medicine considered as science". About a century has elapsed since the time of Sir William but we see that the same misconception still prevails in the minds of

¹ Albutt and Rolleston. *System of Medicine*, vol. I, p. L

² Osler and Merle's *System of Medicine*.

³ Discourse xi, Sir William Jones's *Works*, Vol. I, p. 161.

the scholars. Macdonell¹ gives us a succinct account of the intellectual debt of Europe to the various branches of science and art of the Hindus but regrets that the genetic connection of Indian medicine with that of Greece can not at present be definitely settled. "The question as to whether Indian medical science in its earlier period was affected by that of the Greeks can not be answered with certainty, the two systems not having hitherto been compared with sufficient care." The European mind is quite naturally in the habit of tracing all knowledge to Greece, the fountain of all their knowledge in philosophy and science. But impartial writers are not wanting to vindicate the claims of the Hindus. So Wise remarks as follows² :—"Facts regarding the ancient history of medicine have been sought for only in the classical authors of Greece and Rome and have been arranged to suit a traditional theory which repudiated all systems which did not proceed from a Greek source. We are familiar from our youth with classical history and love to recall events illustrated by the torch of genius and depicted on our memories; and it requires a thorough examination of a subject, a careful weighing of new evidence, and a degree of ingenuousness not always to be found to alter early impressions. Still candour and truth require us to examine the value of new facts in history as they are discovered, so as to arrive at just conclusions". Royle maintains³ that "from the mixture, however, of much ignorance and absurdity with what is valuable, many will be apt to despise altogether the medicine of the East. But if it be recollect how long in Europe prevailed the influence of Galen,

¹ History of Sanskrit Literature, ch. xvi.

² Review of the History of Medicine. Introduction.

³ Antiquity of Hindu Medicine, p. 61.

as well as how many absurd formulas still figure in some continental pharmacopeas, as also how comparatively recent is the time since our own was so greatly improved; some feeling of humiliation will control the pride with which we now view the medical sciences". Neuberger says¹; "The medicine of the Indians, if it does not equal the best achievements of their race, at least nearly approaches them, and owing to its wealth of knowledge, depth of speculation and systematic construction, takes an outstanding position in the history of oriental medicine." It is no doubt unsatisfactory to find that such notions are still allowed to stand in the way of impartial conclusions by eminent men of science especially by those who write history of medicine. But it is not the fault of the historians alone, the fault lies with us for not having supplied them with adequate materials. Something has been done in this field of research by men like Wilson, Heyne, Ainsle, Royle, Dutt, Thacore Shaheb, Jolley, Hoernle and others, but it is nothing when compared to what is required to be done. To supply this want partially, we have endeavoured in this monograph to describe the surgical instruments of the Hindus, with a comparative study of the instruments of the Greek, Roman and Arab surgeons, and of the surgeons in modern times. By a careful study of this subject, we can not avoid the conclusion that the medicine of India though it was not Greek, contained the requirements of science and has a fair claim to be considered in the history of medicine. To it western medicine really owes something and so the subject has been studied and investigated thoroughly.

¹ Neuberger. History of Medicine. Trans. by Playfair. Vol. I. p. 437.

Apart from the usefulness of the study for collecting materials for the history of medicine, there are good reasons for a critical examination of the subject. The knowledge of the Hindus in medical science was by no means rudimentary. There is evidence to show that they were inferior to none in the quality or quantity of the knowledge of the science at that early age. Hoernle says:¹ "Its extent and accuracy are surprising when we allow for their early age—probably the sixth century before Christ—and their peculiar methods of definition." They practised dissection of human bodies and their anatomical studies have the mark of high order. "We have seen that they used various forms of surgical instruments. The Hindus cut for stone couched for the cataract and extracted the fetus from the womb". They performed abdominal section, practised cranial surgery successfully and no region of the body was thought sacred to the knife. They repaired nose and ears by plastic operations, treated fractures and reduced dislocations, and were experts in performing amputations. They reduced hernia, cured piles and fistula-in-ano by surgical technique, and inoculated and vaccinated for small-pox. Field surgery was thoroughly understood and arrows were extracted with skill. They were acquainted with the circulation of the blood,²

¹ Hoernle's Osteology, Preface, P. iii.

² याभिरिदं श्रीरमाराम इव अलहारिष्योऽसि केदार इव च कृष्णभिहपक्षित्वात् । तु मध्यात्मने चकुचनं प्रसारणादभिव्यिशेषेः । तु मपवसेवनौ नामिव च तासो प्रतानाकासो नामिमूलं ततय प्रसरण्यादभिव्यक्तं च ।

Sufrata-Samhitā, III. vii.

दैहसोविपरस्तजो दैहसेव धायेते ।

रह जौवस चाधारकादविदसग्रवधः ॥

the distinction between the artery and vein,¹ the use of anaesthetics, the means of arresting hemorrhage and the proper treatment of surgical wounds. They enumerated 107 vital parts of the body to be avoided, if possible, by the surgeon in practising his handcraft.²

In medicine they first propounded the humoral pathology. Though it seems fanciful in the light of modern culture, it must be admitted that no other theory has been attempted to explain the causation of disease in recent times. "They were the first nation who employed minerals internally and to them we owe the therapeutic use of mercury and arsenic in intermittents". They introduced massage, postural treatment and magnet in therapeutics. They excelled in chemistry and contrived many instruments for the preparation of chemical compounds. Atomic theory was discovered by Kapāda; and "they knew how to prepare sulphuric acid, nitric acid and muriatic acid, the oxide of copper, iron, lead (of which they had both the red oxide and litharge),

विश्वता इवता रामग्रहलनं विलयस्था ।
भूम्यादिपञ्चभूतानामेते रक्ते गुच्छाः कृताः ॥
रक्ते दुष्टे भवेच्छोयो रक्तमग्रहलमेव च ।
व्यव्यादाहय पाकव कल्पूश पीडकोङ्गमः ।
इष्टे रक्ताङ्ग नेत्रत्वं विराचो पूर्णता तथा ।
गावाचां गौरवं निदा मिहो दाहय जायते ॥

Sāṅgadharā Saṅgraha, III. xii.

Bhāva Prakāśa, I. ii.

¹ इन्द्रियोपप्रभं चेयं प्रकृतिस्तसमहतम् ।

Sāṅgadharā Saṅgraha, III. xii.

गुदाः समस्थिताः स्थिर्या रोहिन्यः चुदशोषितम् ।

Aṣṭāṅga Hṛdaya Saṅhitā, II. iii.

² सप्तोत्तरं नवम्बद्धते ।

Safruta Saṅhitā, III. vii.

tin, and zinc ; the sulphuret of iron, copper, mercury, antimony and arsenic ; the sulphate of copper, zinc and iron ; and carbonates of lead and iron¹. The processes of solution, calcination and distillation were discovered by them.

They understood the action of drugs and no less than 500 classes of medicinal agents are enumerated and arranged according to their virtues in curing diseases, and their remedial agents have been collected from the vegetable, animal and mineral kingdoms. There are 41 different forms in which the medicaments may be exhibited to the patient. We have the earliest notice respecting zoology and botanical geography in their works. They had a complete nomenclature of diseases which are described minutely as regards their etiology, symptomatology, diagnosis, pathology, prognosis and treatment.

Veterinary science was well known to them, and treatises on horses and elephants—Asvavaidyaka and Pālakāpya² are still extant, and will repay perusal. Even there is a treatise on the treatment of plants and trees³. Thus we see that the Hindu medical science must not be condemned offhand and requires a careful and sympathetic research by scholars, before it can be excluded from the history of the science.

But I must be careful not to allow my enthusiast admiration carry me too far. It is quite true that the Ayurvedic system has its faults. It has been remarked that "it consisted of erroneous

¹ Elphinstone's History of India, 8th ed. p. 160.

² Another book on the medicine of elephants is quoted by Alberuni. See Sachau's Preface to India, p. xi.

³ For the bibliography of the Ayurvedic books, see my work "Materials, Biographical and Bibliographical, for the History of Hindu Medicine". (In the press).

doctrines founded upon a most fanciful anatomy, physiology and pathology. Much indeed could hardly be expected of a science based upon an anatomy which taught that the navel "constituted a centre from which a vascular system, including 40 principal vessels originated¹; upon a physiology which declared that these vessels were destined to convey blood, air, bile and phlegm to all parts of the body, and upon a pathology which maintained that disease depended either upon derangements of one or more of these humours or "upon the influence of good or evil spirits".² It must however be remembered that this criticism refers to a theory elaborated some 3000 years before. The idea that the navel formed the centre of the vascular system apparently had its origin in the foetal circulation³. The position of the heart was well-known and its function as a propelling organ is

यावत्यस्तु सिरा; काये सन्धवलि शरीरिचां ।
नाभां सञ्चां निवहालाः प्रतन्वलि समन्वतः ॥
नाभिस्थाः प्राणिनां प्राणाः प्राणादाभिवृपात्रिता ।
सिराभिराङता नाभियज्ञानाभिरितारकैः ॥

तासो मूलसिरागत्वारित्यतासां वातवाहिनी दश पित्तवाहिनी दश कफवाहिनी दश दश रक्तवाहिनी ।

Suśruta Saṃhitā, III. vii.

तथान्तरेष नाभेषु ज्योतिःस्थानं पुर्वं अृतं ।
तदा भवति वातस्तु देहसेनाम्ब वर्तते ॥

Ibid. III. iv.

¹ A course of lectures on the Principles and Practice of Medicine delivered at Calcutta Medical College. By Francis, 1868.

² मातुमत् खलु रसवहायां नाभ्यां गर्भनाभिनाडी प्रतिवहा सास मातुराङ्गाररस-बीघ्यमभिवहिति । तेनोपचेहेनाम्भाभिवहिभवति ।

Suśruta Saṃhitā, III. iii.

described in the ancient books¹. In the later Tantras the origin of the nerves from the spinal cord and the brain is distinctly stated². The ancient Hindus, like the Babylonians, thought the heart to be the seat of the understanding, and the liver as the central organ of the blood. The Greeks were the most cultured nation at that age, and the knowledge of the two nations can be compared to our advantage. The Hindus did not share with the Greeks the belief that the uterus is "an animal within an animal" and that it can be attracted by pleasant smells and repelled by pungent substances"³. The humoural pathology was also the keystone of the Greecian system. The belief in the good and evil spirit was the only alternative to the pathologists when the microscope and the germ theory of diseases were unknown. It is highly creditable to the classical Greek physicians for banishing superstition from the practice of the art; but we know that the later Greek writers Aetius, Alexander and Paulus, and the Latin medical literature, were not free from its baneful influence. The belief in charms and miracles in the cure of diseases seems to be universal and is

¹ स रसः इवाचते । तत्त्वं च हृदयं स्नानं स हृदयाचतुर्भिंशतीः धमनीरनुप्रविश्यो हेतु दश दश चाषोगमिन्यथात्मकिर्णगः । तत्क्षेत्रं शरीरमहरहस्तपर्ययति वैद्ययिः धारयति यापयति जीवयति चाहटहेतुहेतु कर्मणा ।

Safruta Saṃhitā, I. xiv.

* ते च लिंगक्षणते नाथी चतुर्भिंशति संख्या ।

मिश्रदलीचित्ताः सर्वे नूत्रे मधिगच्छाद्वय ॥

* * * *

जल्यमूलमधःशास्त्रं हृत्ताकारं कलेवरं ।

यथावत्तदले तदत् शरीरे नाशयचित्ताः ॥

Tantra.

* Paulus Aegineta, Adam's Commentary, Vol. I., P. 636.

working even at the present time. Adams says¹ that "considering the faith which many educated persons now repose in the virtues of galvanic rings and garters, the present generation has little ground for laughing at the credulity of our forefathers, with respect to amulets and other phylacteries".

In later times, attempts have been made to substitute other theories in the place of the humoral, and we know with what results. "Paracelsus substituted an equally baseless hypothesis, that the fundamental element of the human body were three principles : sal, the solid element; quicksilver, the liquid; and sulphur, the aerial. This formula was the badge of the Paracelsist school up to the end of the 17th century." Sylvius and Willi (17th century) of the Iatro-chemical school "referred most diseases to morbid matters or "acrimonies" produced by perverted secretions, and these being sometimes too alkaline, sometimes too acid, the antithesis of acid and alkali became the badge or catch word" of their system. Friedrich Hoffman (1660-1742) constructed another system which "supposed life to be a universally diffused ether, which entering the animal body, became transformed in the brain into Pneuma or nervous fluid. "George Ernest Stahl (1660-1734) believed in the hypothesis of Animism, and "the symptoms of disease were regarded as the conscious efforts of the soul to overcome the morbid influences". William Cullen (1712-90) "propounded a new system of medicine, intended to reconcile the opposing views of his predecessors. Its main feature was the importance attached to the nervous system in the causation of disease." Lastly the "Brunonian" system of John Brown, based on

¹ Adam's Commentary on Paul.

the doctrine of stimulus, and Hahneman's theory of homœopathy need be mentioned here to complete the list.¹ Thus we see that even some of the eminent men of science indulged in fanciful theories in quite modern times.

The study of ancient Hindu medicine has an antiquarian value. It is perhaps the oldest system of medical science still extant. Fragments of Egyptian and Assyrian medicine have no doubt been unearthed. But these cannot be compared with the complete system of the medical science as preserved in the early Sanskrit works on the subject. The Hindus believe their science of medicine to be of divine origin and this belief is founded upon the fact that the existence of the medical profession can be traced back to prehistoric times. The humoral theory is mentioned in the Rgveda² which according to the consensus of opinions amongst the European savants can not be later than 2000 B.C., and possibly earlier. The Buddhists relate a story, how, in one of his former births, Buddha was born as a medicine-man. "In the Mahosadha birth the archangel Sakka came to him as he was being born, and placing some fine sandal-wood in his hand, went away. He came out from the womb holding this in his fist. His mother asked him "What is it you hold, dear, as you come?" He answered "Medicine, mother!" So because he came holding medicine, they gave him the name of medicine-child (oṣadhadhāraka). Taking the medicine they kept it in a chatty (an earthenware water-pot) and it became

¹ Medicine in modern Europe. Payne in Albutt's System of Medicine, vol. I, p. 26, 29, 34.

² ओमाने वैदीर्मकाय मृदुं तिष्ठतु शम् वहत् यमस्यतो ॥

Rgveda, I. 34, 6.

a drug by which all the sickness of the blind and deaf and others as many as came, was healed—so the saying sprang up, “This is a powerful drug”; and hence he was called Mahosadha (The great medicine-man).¹ This early date of the science amongst the Hindus is not exceptional. It is now well-known that so severe an operation as trephining the skull was often performed in the early stone age. “Trephined skulls from neolithic period have been found in most European countries, in Algiers, the Canaries, North America, Mexico, Peru and the Argentine”². In the Code of Hammurabi, king of Babylon (2285-2242 B. C.), there are thirteen articles regulating medical practice. One deals with the responsibilities of a surgeon performing operations on the eye. The laws Hammurabi lay down that:—

“If a Physician cause a severe operation wound with a bronze operating knife and cure the patient, or if he open a ‘tumour (cavity) with a bronze operating knife and save his eye, he shall have ten shekels of silver.

“If it be a freedman, he shall have five shekels.

“If it be any one’s slave, his owner shall give the physician two shekels of silver.

“If the physician make a severe wound with a bronze operating knife and the patient die, or if he open a growth with a bronze operating knife and the patient lose his eye, he shall have his hands cut off.

“If a physician make a severe wound on the person of

¹ Rhys David’s Buddhist Birth Stories, vol. I, p. 67-68.

² Neuburger’s History of Medicine, P. 3.

a slave belonging to a freed man with the bronze operating knife and kill him, he shall replace the slave by another slave.

"If a physician heal a broken bone or cure diseased bowels, the patient shall pay the physician five shekels of silver."¹

Homer pays tribute to Egypt for her

"Patron-god imparts
To all the Pharian race his healing arts."

Herodotus says that the Egyptian physicians were specialists of particular diseases, and Clement of Alexandria mentions forty-two Hermetic books on medicine by the god Thot.

"According to Manetho, he (Teta) constructed the Royal castle of Memphis and wrote a work on anatomy² being particularly occupied with medicine. The latter supposition is rendered more complete to a certain extent by the account, due to Ebers Papyrus³, that the method of making the hair grow, described accurately therein, was supposed to have been discovered by our king's mother, Shesh."⁴ Teta was the second king of the first dynasty of the old Memphis kingdom and flourished in 4366 B.C. King Senta of the second dynasty owned a medical work which belonged to Semti or Hesepti (4266 B.C.), the 5th king of the first dynasty.⁵ "Tosorthros of the third dynasty, was said to have composed a treatise on medicine,⁶ a fact which

¹ Neuberger, History of Medicine, P. 18.

² Manetho, in Müller-Didot, *Fragmenta Historica Graec*, vol. II, pp. 539, 540.

³ Ebers Papyrus, Pl. Ixvi, 1, 5.

⁴ Historian's History of the World, vol. I, Egypt and Mesopotamia, p. 91.

⁵ Ibid, p. 68.

⁶ Manetho, etc., vol. II, p. 544.

caused him to be identified with the healing god Imhotpū."¹ These facts suggest a great age for Egyptian medicine, Medicine flourished among the Assyrians: "Fragments of an old work on medicine have been found, which show that all known diseases have been classified and their symptoms described; and the medical mixtures considered appropriate to each being compounded and prescribed quite in modern fashion."²

The oldest medical treatise extant amongst the Chinese is the Neiching, the authorship being attributed to Hwang-ti; it dates back to B. C. 2597. Mr. Gatzlaff,³ missionary in China, has given us a short view of a celebrated work, in 40 volumes, on Chinese medicines, which is called Ching che chun ching i. e., "Approved marking line of medical practice"⁴ So the Hippocratic treatises (460 B. C.) are rather modern compilations compared to these ancient books; and as told by Plato, the priest of Sais was fully justified when he addressed to Solon: "You Greeks, you are but children."⁵

It will be seen again that a comparative study of the science discloses remarkable affinity to the systems of the other contemporary nations. The fabulous origin of medicine in India and Greece can not fail to attract the notice of even a casual observer. The resemblance of Dakṣa, the preceptor of the two Aśvins, the offspring of Sun, who after learning the

¹ Ibid, p. 544 and 545.

Quoted in Maspero's "The Dawn of Civilization," Edited by Prof. Sayce, 5th ed. p. 238.

² Assyria; its Princes, Priests and Peoples, Sayce, p. 119.

³ Proceedings of the Asiatic Society, Part VII, p. 154.

⁴ Royle. Antiquity of Hindu Medicine, p. 67.

⁵ Timaeus, p. 22.

Ayurveda from their father became the medical attendants of the gods, to *Aesculapius*—the reputed son of Apollo, and his two sons Machaon and Podalarius, celebrated in the Homeric poems, is indeed remarkable. More remarkable is the belief in humoural pathology shared by the two nations, separated from each other by continents and seas, and alienated from each other by the differences in customs, manners and religion. The theory of independent origin and developement falls to the ground, especially when we consider the strange coincidence in the surgical instruments used by the two nations in performing surgical operations. Some of the instruments used by the Hindus were not only identical in structure and shape to the instruments of the Greeks, but they had even the same name. Thus for instance, the alābu yantra of the Hindus corresponds to the description of the encurbitula of the Greeks, and both the terms mean a gourd. A śrīga is the horn; aṅguli yantra or mudrikā is the finger or ring-knife; yoni-vranekṣaya is the diopter or vaginal speculum; aṅkuśa is the hook; &c. Some instruments though they have different names are identical in structure and uses. Thus, the Scammum Hippocraticum or the Plinthium Nelei is the Greek counterpart of the Hindu kapātaśayana; the lithotomy binding of the yantraśatakam; the clyster of the vastiyantra; the saw of the karapatra; the needle of the sūci; &c. Again many surgical operations are similarly described in both the systems, as for examples, the operations for stone and cataract may be cited. In the description of diseases, passages occur in books which seem to be a literal translation of one from the other. Thus in describing the symptoms of hydrophobia, Paulus quotes Rufus who pronounces it to be a

species of melancholy and then observes "Which reason accords also with those who say that they think they saw the image of the dog that bit them in water". The word "those" in the above sentence becomes clear to us when we read a similar passage in the *kalpasthāna* of the Suśruta Saṃhitā, and it may be thus translated:¹ "If the patient sees the image of the animal that bit him in the water or mirror, he is sure to die." Other passages might be multiplied but our limited space forbids any further quotations. All these coincidences can scarcely be accidental; and though we may not be able to trace the actual progress of medicine from India to Greece, yet the evidence in favour of its transmission is too strong to be held in doubt.

Thus the question of the relation of the medical science of the Hindus to that of the Greeks naturally suggests itself for solution. The possibility of a dependence of the either on the other can not be dismissed offhand for we have historical evidence of communication between the two nations at a very early age. We need not dwell at length upon those shoals and quagmires of historical controversies, the alleged conquest of India by Egyptian Seostris as recorded by Diodorus Seculus² in prehistoric times; the connection of the Phoenician traders as proved by the articles of merchandise,—cinnamon, aloes, onyx, agate, ebony, tin and ivory³ diamond, gold and

¹ सुश्रुता यदिवादम् रिष्टं सप्त विनिहिंगेत् ॥
वस्त्रकाशाद् योऽभौज्ञं चलाहटापि वा जर्णे ।
अलवासनुविद्यात् रिष्टं तमापिकीर्तिं ॥

Suśruta Saṃhitā, V. vi.

* L. ib. I. ch. 43. Nolan.

* Strabo. xv. 37. (Quotes Megasthenes; Theophrastus quoted by MacCrindle in Ancient India as described by classical authors, p. 46; Virgil, Georg. II. 116-17 ("India alone produces black ebony"), Georg. I. 57. ("India sends Ivory"), Lonsdale and Lee's trans.; Horace, odes I. 31.

embroidered work¹ the commercial enterprises of the ships of Solomon (992 B. C.) from Ezion-Gaber² under the guidance of the mariners of Hiram (B.C. 980-917) which brought back the gold of "ophir," its almug trees and ivory, apes and peacocks; the possibility of an Indo-Hellenic intercourse to explain the remarkable coincidences between the systems of philosophy current amongst the two nations, and which culminated in the bold theory of Pococke³ that Pythagoras, who is generally considered to be the founder of the healing art amongst the Greeks⁴ was an adaptation of the Buddhugurus, and the assertion that Greece must have been an Indian colony before. Let us rather tread on firmer grounds and we know that two Greek physicians, Ktesias (about 400 B.C.) and Megasthenes (300 B. C.) visited Northern India. Ktesias in his *Indica* mentions the cochineal plant, its worm and dyes, monkeys, elephant and parrot. He says that the Indians were free from headache, toothache or ophthalmia and from mouth sores or ulcers. Alexander the Great (B.C. 327), so says Nearchus, employed some Hindu vaids in his camp in India to consult them in cases of snake-bites and other dangerous ailments. Megasthenes mentions ebony as growing in Bengal, and tiger, monkey and elephants are also alluded to. Strabbo mentions that Daimacus was sent to the court of Candragupta's son, but unfortunately the book he wrote about India is lost to us. Mention also should be made of the intercourse of Egypt with India under the Ptolemies and we know, that Ptolemy

¹ Birdwood's Industrial Arts of India, pp. 263-4.

² I. King. ix. 27; xii, p. 22.

³ India in Greece.

⁴ See the Origin and Growth of the Healing Art—Beddoe. 169.

Philadelphous sent an embassy headed by one Dionysos to the court of Pātaliputra. Another source of dissemination of Hindu learning over the Western world is the emigration of the Buddhist missionaries to the kingdoms of Ptolemies and Greek kings as proved by the edicts of Aśoka. "And the Greek Simnoi (venerable) were no other than the Buddhist sramanas (these simnoi whom Clement of Alexandria has narrated to have rendered worship to a pyramid originally dedicated to the relics of a god, were the Buddhist Arhats (venerable) sramanas).¹ The intercourse of the East and West after the Christian era is well known and will not supply us with any proof as to the indebtedness of the Greeks and Hindus to each other; though "Dietz proves that the late Greek physicians were acquainted with the medical works of the Hindus, and availed themselves of their medicaments"; but he more particularly shows that the Arabians were familiar with them, and extolled the healing art as practised by the Indians, quite as much as that in use among the Greeks.²

But what is more important to us as a proof of the influence of the Indian medical science upon the Grecian system is the identification of drugs of Indian origin in the *materia medica* of the Greeks. For instance the Sacred Bean of Pythagoras has been identified with Utpalam or Indian *Nelumbium*.³ Hippocrates the Great, who was contemporary and kinsman of Ktesias⁴ the court physician to the king of Persia, mentions:—*Sesamum Indicum* (*Tila*); *Nardostachys Jatamansi*

¹ Lalitvistaram. Mitter's ed. ch. 1.

² Journal of Education, Vol. viii, p. 176.

³ Pratt's Flowering Plants, Vol. 1, p. 67.

⁴ Galen; Comment, in libr. de artic. iii.

(*Jaṭāmāhiṣī*); Beswillia Thurifera (*Kundurn*) ; Zinziber Officinale (*Śṛṅgavera*) ; and Piper Nigrum (*Marīci*). Dioscorides (1st century A.D.) in his *Materia Medica* describes :—Agallochum, Bdellium, Ebony (*Diosphynos Ebenaster*), Ammonum zinziberis (*Ginger*), Calamus aromatius (sweet cane of Scripture), Eletteria Cardamonum (*Elaci*), Lycium Indicum or Russot, the product of Berbera lycium, Atramentum (*Indigo*), Onyx or the operculum of an Indian shell-fish, etc. In later times, we find Aetius, an Alexandrian writer of the 5th century describing Indian nuts, sandal wood, cocoanuts, etc. Symon Set mentions camphor; and Paulus Aegineta (7th century A.D.), a writer well known for his judicious condensation of the Greek medical literature, mentions Aloes, Cantharides (*Mylabris Ciehory*), Cloves (*Caryophyllum Aromaticus*), Millet (*Panicium Halicum*), Costos (root of *Auklandia Costos*), Cassia (*Cinnamomum Cassia*), Indian stones as amulets, Malabathri or *tejpāt* (*Laurus Cassia*), Ambar, etc.

Now let us reproduce some of the conclusions arrived at by Western scholars as the result of the controversy. As regards philosophy, Colebrooke¹ asserts that "the Hindus were teachers and not learners". Cunningham² says: "Indians have the advantage in point of time; and I feel satisfied that the Greeks borrowed much of their philosophy from the East". Weber³ remarks that "there is no ground whatever to suppose that Suśruta borrowed his system of medicine from the Greeks, on the contrary there is much to tell against such an idea".

¹ Transactions of the Royal Asiatic Society, vol. I.

² Bhilsa Topes, pp. 32-33.

³ History of Indian Literature,

Prof. Diaz of the Konnigsberg University, detects the principles of Indian medicine in the medical literature of the Greeks". "It is to the Hindus" says Wise, "we owe the first system of medicine." Royle has proved beyond doubt the indebtedness of the Greeks and Arabs to the Hindus. Haas's theory that Suśrata is the Indian adaptation of the Arabic name of Suqrat or Buqrat, the Arabic corruption of the Greek Hippocrates, and that Kāsi is an adaptation of the Island of Cos has been deservedly condemned as "an elaborate joke". Neuberger says:¹— "The similarity between Indian and Greek medicine of the period is in its outline and in certain details so striking that it is hardly surprising that the originality of the former has frequently been questioned or even denied. The more so is this true since the dates of the more important Indian works are fixed with the greatest difficulty, and before the discovery of the most recent manuscripts they were quite indefinite.

In consideration of the outstanding independent achievements of the Indians in most branches of science and art, and of their aversion from foreign influences, the trend of opinion to-day, informed by recent discoveries is in favour of the originality of Indian medicine in its most salient features."

Another fact must here be pointed out that the Hindus always acknowledged any help they might have received from other nations for the development of their science. The striking proof of this is found with reference to the science of astronomy—the only branch of learning which seems to have been influenced by the Greeks. Varāhamihira compiled his famous Pañcasiddhāntica or the collection of the five old treatises on astronomy,

¹ Neuberger. History of medicine, Vol. I, p. 45.

eis., Paulisa, Romaka, Vaśīṣṭha, Saura, and Paitamolia. Both Weber and Kern have no doubt that Paulisa was a Greek and the name Romaka speaks for itself. But in the Hindu medical literature there is no mention of any foreign help, and the Indian medical treatises do not contain a single technical term which points to a foreign origin. It is interesting to quote the well known passage of Garga: "The Yavanas (Greeks) are Mlechhas, but amongst them the science (astrology) is well established. Therefore they are honoured as Rsis—how much more than an astrologer who is a Brähmany". It is a standing monument of the catholic spirit of the Hindus, and they know no better way to show their respect for the learned men of the world. To this may well be contrasted the behaviour of the Greeks towards the other nations. The doctrines of Pythagoras are pre-eminently Indian¹, but that philosopher has not a word to speak of the Hindus. In astronomy the Greeks are indebted to Babylon: Ptolemy mentions that Hipparchus worked out and improved upon the astronomical computations of the Babylonians with reference to the moon; but recent discoveries from the clay tablets have shown that the figures ascribed to Hipparchus are merely copied from the numerical values worked out in Babylon. "The discovery of the precession of the equinoxes is generally ascribed to Hipparchus. It was he indeed, who brought this fact to the Greeks, and he estimated its yearly amount as from 36 to 39 seconds, but it is certain that he learned about it in Chaldea, and that he obtained the elements of his calculations from the astronomical observations made on the lower Euphrates".² Paulus Aegineta

¹ See Enfield's History of Philosophy.

² Historian's History of the World, Vol. I, p. 590.

gives us a complete system of operative surgery of the ancients. Celsus, in the last two books of his work, has treated of the surgical operations with considerable accuracy; and though the former availed himself of the labours of the latter, Celsus is never mentioned as one of the sources of informations used by Paulus who appears to have been wholly unacquainted with his works; and Adams remarks "but when did a Greek writer ever acknowledge himself under obligation to a Roman"?

But are we to suppose that the Greeks wilfully concealed the names of the Indian physicians in their books? Surely not. The Greeks might not have known the real source of the informations which they probably received second-hand. There is historical evidence of an intercommunication between Greece and Persia from the time of Ktesias or the 4th century B. C. to the 6th century A. D. We also know of a tradition that the services of the Great Hippocrates—a kinsman of Ktesias, were required in the Persian court, but he declined the invitation. Again we know that books on ancient sciences of India were possibly made use of by the Persians in early times, and to this intercommunication may be due "the coincidences which have been observed between the science of the Greeks and that of the Hindus" (Royle).

As regards the indebtedness of the Persians to Sanskrit literature,⁴⁴ we have positive testimony on the subject, as the Baron de Saey, in his account of the well-known Sanskrit origin of the Fables of Pilpay, states that these were first translated in Pehlevi during the reign of the Persian king Nooshirwan, who ascended the throne in 531, and died in 579 and who is reported by historians to have encouraged learning, and to have induced Greecian philosophy at his court. The translation

were made by the physician Barzouyeh who had brought the original from India with other books, and who by more than one previous journey to that country, had acquired a knowledge of Sanskrit. He is stated particularly, to have made two journeys, one for the purpose of procuring medicaments and herbs, and the other for obtaining specimens of literature of the Hindus¹. "Previous even to this (A. D. 330), we hear of the Persian king Bahram visiting, in disguise, the court of Basdeo, sovereign of Canouge, to study the laws, religion and manners of the Hindus."²

But whatever differences of opinion there may be as regards the relation of the Greeks to the Hindoos, there is no doubt that the medical science of the Arabs was materially influenced by Hindu medicine. For we know that the medical treatises of Caraka, Suśrata and Mālava were translated into Arabic in the beginning of the 8th century A. D., and the names of Scarae, Seirae or Xarae and Sarad occur in the Latin translations of Avicenna, Rhazes, and Serapion.³ Rāy dwells at length on the similarity of description of leeches as written by Suśrata and Rhazes. The modern medical science of the West is principally based on the Greco-Roman system as preserved in the books of the Arabian authors and so indirectly depends for some particulars at least upon the Indian system.

Sachau in his preface to Alberuni's India⁴ remarks as

¹ Antiquity of Hindu Medicine, p. 168-69.

² Ibid, p. 73.

³ Rhazes: 'De Emblico,' (Scarae Indianus), 'De Zinzibore, (Sarac) Serapion: 'De Myrobalanis' (Xarch Indus), 'De Emblicis et bellericis (Xarcha Indus); Avicenna: 'Sub Emblico' (Seirae Indum).

⁴ Alberuni's India, Preface, p. xxx-xxxi.

follows:—¹ What India has contributed reached Bagdad by two different roads. Part has come directly in translations from the Saṃskrit, part has travelled through Iran, having originally been translated from Sanskrit (Pali ? Prakrit ?) into Persian, and further from Persian into Arabic. In this way, e.g. the fables of Kalila and Dimna have been communicated to the Arabs, and a book on medicine probably the famous Caraka. cf. Fibrist p. 303². The Arabs also translated “Indian works on snakes (sarvavidyā), on poison (visavidyā).....on the veterinary art¹.....But not only were the medical books translated into Arabic we have evidence that Indian doctors practised in foreign courts. Sachau continues:—“Another influx of Hindu learning took place under Harun (A. D. 786-808). The ministerial family Barmak, then at the zenith of their power, had come with the ruling dynasty from Balkh, where an ancestor of theirs had been an official in the Buddhistic temple Naubehar, i.e., nava vihāra—the new temple (or monastery). The name Barmak is said to be of Indian descent, meaning paramaka, i.e., the superior (abbot of the vihāra ?) cf. Kern, Geschichte des Buddhismus in Indien, ii. 445, 543. Of course, the Barmak family had been converted, but their contemporaries never thought much of their profession of Islam, nor regarded it as genuine. Induced probably by family traditions, they sent scholars to India, there to study medicine and pharmacology. Besides, they engaged Hindu scholars to come to Bagdad, made them the chief physicians of their hospitals, and ordered them to translate from Sanskrit

¹ Alberani's India, Preface, p. xxxiv.

² Ibid. p. xxxii.

into Arabic, books on medicine, pharmacology, toxicology, philosophy, astrology, and other subjects. Still in later centuries, muslim scholars travelled for the same purpose as the emissaries of the Barmak, e.g., Almuwaffak, not long before Alberuni's time (*Codex Vindobonensis, sive medici Abu Mansur liber, fundamentorum pharmacologie*, Ed. Seligmann, Vienna, 1859, pp. 6, 10, and 15, 9).¹

"Harun-al-Rashid (786-809) had two Indians Manka and Saleh, as physicians at his court"² Manka translated the classical work on medicine, *Suśruta* (cf. Steinschneider, *Wissenschaftliche Blätter*, Vol. I, p. 79) and a treatise on poison, ascribed to Kānakya, from Sanskrit into Persian (see Prof. Flügel, in *Zietschrift der D. M. G.* xi. 148 and s. 325). A Hebrew treatise on poison, ascribed to the Indian Zamik (Kanakya) is mentioned by Steinschneider *Wissenschaftliche Blätter*, Vol. I, p. 65). Alberuni mentions an Indian Kankab as astrologer of Harun-al-Rashid (Reinaud, *mémoire sur l'Inde*, p. 315). He is likewise mentioned as a physician. Another Indian physician of Harun-al-Rashid is called Mankba (Reinaud). In the year 1381, a work on veterinary medicine ascribed to Salotar was translated from Sanskrit by the order of Firroz Shah after the capture of Nagorecote. A copy of it was preserved in the Royal Library of Lucknow³. Among the Hindu physicians of the time one دھانی is mentioned i.e., the son of DHN, director of the hospital of the Barmaks in Bagdad. This may be Dhanya, or Dhanian chosen probably on account of its etymological relationship with the name Dhāñvantari the name

¹ Prof. Dietz, quoted by Royle, p. 64.

² Maxmüller's *Science of Language*, Vol. I, p. 166.

of the mythical physician of the gods in Manu's law book and the epics (*cf.* A. Weber, *Indische Litteraturgeschichte*, pp. 284, 287). A similar relation seems to exist between the names Kanka, that of a physician of the same period, and Kankayana, an authority on Indian medicine (Weber *l. c.*, pp. 287, note, and 284 note, 302). The name *जबै*, that of an author of a book on drinkables, may be identified with Atri, mentioned as a medical author by Weber, *l. c.* p. 288.¹¹

For informations on the Arabic translations of Sanskrit works, see *Analecta Medica* by Dietz; Wustendeld's *Geschichte der Arab Aerzte*; Cureton, "A collection of such passages relative to India as may occur in Arabic writers"; Wilson's note to the above in *J. R. A. S.* old series, vi, pp. 105-115. Puschmann, p. 162; and Bedroe, book iv. ch. II. pp 286-299.

The Arabians added many drugs to the *materia medica* of the Greeks and amongst them we find the following Indian drugs described:—

Djūdar or Pinus Deodara.....	Devadāru ²
Artemesia Indica.....	Nāgdamani.
Piper cubeba.....	Sugandha marica.
Cassia fistula.....	Suvarnakha.
Senna or Cassia obtata.....	Sonāmukhi.
Galangal or Alpina galanga, Roxb.....	Kulin-jana.
Ammomum grana paradisi.	
Macis.....	Mace.
Nux moschata.....	Nutmeg.

¹ Sachau. *Ibid.* p. xxxii.

² It is described by Avicenna under its Sanskrit name, where he says that deindar, "est ex genere abhel juniperus, que dicitur pinus Indi; et syr dindar est ejus lac" (Quoted by Royle).

Bdellium.	Guggula.
Tamarindus Indica.	Tintidj.
Trifolia.	Triphala. ¹
Myrobalani.	Hāritaki.
Turpeth or Convolvulus Turpethum.	Trivit.
Sel or Aegle marmelos.	Vilva.
Santalum rubrum.	Candana.
Melia azadirachta.	Nimba.
Tembul (Piper betel).	Tāmbūl.
Paufil (Areeha catechu).	Khadira.
Nux vomica.	Visamūsti.
Musa paradisiaca or plantain.	Kadali.
Moschos moschifera (from Thibet & India).	Mṛgānābhi.
Dolichos lebleb.	
Orange or Citrus aurantium.	Nāgarāṅga.
Limon or citrus medica.	Mātulufiga.
Pearls and other precious stones such as lapiz lazuli, Borax, &c.	
Rhabarburnum or Indian Rhubarb, etc.	

We can trace the Arabic and Greek names of some of the medicaments to a Sanskrit source. Royle has discussed them at length, so we need give here only a synopsis of it :—

Triphala (S)—Tryphalla (A)—Tryphalla (G)—Tryphala parva (modern).
 Devadāru (S)—Deiudar (Avicenna)—Deedara (G)—Pinus deodara.
 Tvaka-kshira (S)—Tabosheer (A).
 Tamālpatra (S)—Malatroon or Malabathrum (G).
 Tejapatra(s), or tuj—Sadej (A).

¹ Actuarius copies from Serapion and Mesue, the use of this medicine. The very name is Sanskrit, meaning the 3 myrobalans. Serapion refers to Xarch Indus or Charak, in his De Myrobalani (Royle, p. 27).

Tāmbula (S)—Tumbol (P)—Tunbol (A).

Pippali (S)—Pippul (H)—pilpil (P)—filfil (A)—(G)—piper (E).

Sṛāgavera (S)—Shimgveez (P)—Zinzabil (A)—Zingiber (E).
Aguru (S)—aggur (H)—Agila (M)—Pao-d'aglia (aquilia)
(po)—Aod Hindee Agallochum (G).

Candana (S)—chundan (H)—Shandana (T)—Sundul (P)—
Santal (E).

Kolinjana (S)—Galanga (G).

Vaca (S)—Wuz (A).

Dāvrusita (S)—Darcheeni (H)—Darsheeni (A).

Caeyn-nama (C)—Akimona (P)—Kaimanis (M)—Cinnamon.
Kuṣṭha (S)—Kooth (H)—Kust (A)—Koosrus (G)—
Koshta (Sy).

Abnus—Ebony (E).

Kubara (S)—pupal (P)—fufal (A).

Sajikā (S)—Sajiumattee, sajiloon, sajii (H)—Sajimen vitri
(Geber)—Soza or soda (E).

Khar, khari (S)—Kali. (A).

Kussas, missy (India)—misy (A)—misy (G).

Tineana (borax)—Tinkar (P)—tineal (E).

Ambara (S)—Kharoba (A)—Amber, Ambegrise (E).

Kassis (tin)—Kassiteros (G).

Tuttha (S)—tootum or tutia (H)—tutia (P)—tatangum
(T)—tutenagun and tutty.

Manasīlā (S)—Mansil (G).

Haritāl (S)—hartal.

Sarkarā (S)—sakkara (T)—sukkur (A)—Sugar (E).

Sandaracha (S) or sulphuret of arsenic—Zarnach (P & G).

Sphotaka (S)—phoska (B)—pocca (A. S.)—pocke (Ger).

Tintidji (S)—Tamar Hind (A)—Tamararin (Fr)—Tamarinds (Italy & Sp.)—Tamarind (B)—Tamarindus India (L).

Masurikā (S)—Masern (Ger)—Measles (E).

Vraṇa (S)—verole (Fr)—variola (L).

Danga (Hindus)—Dandy—Dengue (Sp).

S—Sanskrit. A—Arabic. G—Greek. T—Tamil. P—Persian. M—Malayan. Po—Portuguese. Sy—Syriae. Ger—German. A. S.—Anglo-Saxon. H—Hindi. E—English. B—Bengali. Fr—French. L—Tatin. It—Italy. Sp—Spanish.

Not only is the influence of the Sanskrit medical works detected in the Persian, Hebrew, Arabic, Greek and Roman works on medicine, there is evidence that the Hindu system of medicine was also adopted by the Tibetans and the Chinese. In the January No. 37 of the J.A.S.B. 1835 Vol. IV, an analysis of a Thibetan work is given by Alexander Csoma de Koros. It is called “rgyud bzhi” (the tract in 4 parts). It is attributed to Sakhya. “In the time of Khrisrong Dehutsan (*i.e.* 8th or 9th century of the Christian era) a Tibetan interpreter Bairotsana (or Vairochana) having translated in Cashmere, with the assistance of physician-pandit (Davam Non-gah) presented it to the above mentioned Thibetan king.” In a Note on Thibetan surgical instruments, Walsh says:¹ “The present practice of surgery in Tibet is very simple, and, as already noted, consists chiefly of cupping, cauterizing, and bleeding. The Am-chhi informed me that the only instruments used are the cupping-bow (燒罐 me-puś, or 烧罐 me-bum, both meaning ‘fire vessel’), in which

¹ The Thibetan Anatomical System by E. H. C. Walsh in J. R. A. S. 1910, pp. 1244-45.

paper is lit and the bowl is placed while hot over the part to be blistered; the sucking-horn (လျှိမ်း 4jib-ru), by which cupping by vacuum is done; the cautery (ဇူးဆန်း lehags-me), the lancet (ခြံး risa-u), for bleeding, and a golden lancet (ကျော် ရှုံးခြံး gser kyi risa-u) for operating on the eye.

In the journal of the Buddhist Text Society of Calcutta for 1894 three Tibetan block prints are illustrated, which contain representations of a large number of surgical instruments, some of them of an elaborate nature, including specula, saws, catheters, exploring needles, instruments for tapping hydrocele, and midwifery and other forceps. The block-prints were brought by Rai Saratchandra Das, Bahadur, from Lhasa,¹ and a description of the figures was given by the late Lama Ses-rab MGya Mtsho, the Abbot of Ghoom Monastery, near Darjeeling, who was formerly physician to the late Tashi Lama, which were explained * in a paper read by Dr. Saradaprasad Banerjee.²

If the elaborate and various instruments shown in the block-print were ever in general use they appear to have now ceased to be used."

In the J.R.A.S. April 1907, is mentioned "a Chinese text corresponding to a part of the Bower manuscript" by Watanbe. The identified portion of the MSS. consists of the six leaves which appear in plates XLIX-LIV (Hoernle's ed). The corresponding Chinese text is contained in six translations of which the following three, correspond completely to the MSS.

¹ Journal of the Buddhist Text Society, Vol. II, Pt. III, Calcutta 1894.
P. III.

² Ibid, pp. IX. X.

1.	Mohamayuri vidya-rajui	—translated by I'tsing	705 A.D.
2.	"	"	Amoghavajra 746 to 771 A.D.
3.	"	"	Sanghapala 516 A.D.

Again many articles are common to the Hindus and Chinese *materia medica*; as many aromatics (nutmeg, cloves, cinnamon and pepper), musk, rhubarb etc. And this is not at all surprising for we have evidence "that there was constant intercourse¹ between these countries even before the Christian era, by means of travellers and ambassadors; and that Buddhist priests in visiting China, took with them as presents classical Indian books. It is also worthy of note, in connexion with the chapter on this subject in Suśruta, that in A.D. 648, the Emperor of China having sent an ambassador to India, this officer met with a doctor, who told him that he was 200 years old, and that he possessed the recipe of immortality, upon hearing which, a second embassy was despatched in search of the philosophical "stone" (Royle).

Even the modern medical science of Europe has been directly influenced by the Hindu system of medicine. In the *materia medica* used by the doctors in Europe now, we find the following curative agents—the produce of India. I quote here the list as prepared by Thakore Shaheb² :—

"Aconitum heterophyllum	...	Ativisha.
Allium cepa	...	Polandu.
Acacia catechu	...	Khadira.

¹ See *Asiatic Journal*, July 1836.

² *History of Aryan Medical Science*, P. 128.

<i>Alhagi maurorum</i>	...	<i>Yavasa.</i>
<i>Alstonia scholaris...</i>	...	<i>Saptaparna.</i>
<i>Ammomum elettarum</i>	...	<i>Ela.</i>
<i>Audropogon nardus</i>	...	<i>Ushira.</i>
<i>Andropogon schenanthus</i>	...	<i>Katorina.</i>
<i>Artemisia sternutatoria</i>	...	<i>Agnidamani.</i>
<i>Berberis lycium</i> ...	...	<i>Daruharidra.</i>
<i>Butea frondosa</i> ...	...	<i>Palasha.</i>
<i>Cassia lanceolata</i> ...	...	<i>Sonamukhi.</i>
<i>Cucumis colocynthis</i>	...	<i>Indravaruni.</i>
<i>Datura alba, niger &c.</i>	...	<i>Dhattura.</i>
<i>Justicia adhatoda...</i>	...	<i>Atarusha.</i>
<i>Luffa amara</i> ...	...	<i>Katukoshtaki.</i>
<i>Linum usitatissimum</i>	...	<i>Atasi.</i>
<i>Mallotus Philippiensis</i>	...	<i>Kapillaks.</i>
<i>Myrica sapida</i> ...	...	<i>Katfala.</i>
<i>Ophelia chiretta</i> and <i>Ophelia</i> <i>augustifolia</i> ...	...	<i>Kirata.</i>
<i>Pimpinella Anisum</i>	...	<i>Shatapushpa.</i>
<i>Pongamia glabra...</i>	...	<i>Karanja.</i>
<i>Ptychotis ajowan</i> ...	...	<i>Ajamoda.</i>
<i>Ricinus communis</i>	...	<i>Eranda.</i>
<i>Salvinia cucullata</i>	...	<i>Undurkarnika.</i>
<i>Santalum album</i> & <i>Santalum</i> <i>flavum</i> ...	...	<i>Chandana.</i>
<i>Shorea Robusta</i> ...	...	<i>Ajakarna.</i>
<i>Strychnos potatorum, Strychnos</i> <i>nux vomica</i> ...	...	<i>Katakafala.</i>
<i>Tinospora Cordifolia</i>	...	<i>Gujuci.</i>

<i>Valeriana Hardwickii</i>	...	Tagata.
<i>Wrightia Antidysenterica</i>	...	Indrayava."

To this list may be added the following drugs from the Indian and Colonial Addendum to the British Pharmacopœa, 1898:—

<i>Acacia Arabica</i>	...	Vävvula.
<i>Acalypha Indica</i>	...	Muktabarā.
<i>Andrographis Paniculata</i>	...	Kirāta.
<i>Aristolochia Indica</i>	...	Arkamula.
<i>Arachia Hypogaea</i>	...	Bucanaka.
<i>Citrus Aurantium</i>	...	Nāgamāṅga.
<i>Azadirachta Indica</i>	...	Nimba.
<i>Aegle Marmelos</i>	...	Vilva.
<i>Piper betel</i>	...	Tāmbula.
<i>Butea Gummi.</i>		
<i>Cesalpina Sappan.</i>	...	Patanga or Bakam.
<i>Calotropis Procera</i> and <i>C. Gigantie</i>	...	Arka.
<i>Gossypium Herbaceum</i>	...	Kārpāsa.
<i>Cambogia Indica.</i>		
<i>Cissampelos Pariera</i>	...	Ambashthai.
<i>Coscinum Fenestratum</i>	...	Dāru-haridrā or darvi.
<i>Gynocardia Odorata</i>	...	Chālmugra.
<i>Hygrophila Spinosa</i>	...	Kokilākṣa.
<i>Anogeissus Latifolia</i>		
<i>Embelia Ribes</i> and <i>E. Robusta</i>	...	Vidāṅga.
<i>Plantago Ovata</i>	...	Ispaghula.
<i>Ipomoea Hederacea</i>	...	Kālādāna.
<i>Ipomoea Turpethum</i>	...	Trivit.

Mylabris Phalerta.

Terminalia Chebula ... *Haritaki.*

Sesamum Indicum ... *Tila.*

Picerorhiza Kurroa ... *Katuka.*

Urginea Indica ... *Vanapalāñdu.*

As regards the medicines used by the Hindus, Neuberger says¹:

"The Pharmacopæia, corresponding with the fruitful nature of the land was a rich one and stamps Indian medicine with a character entirely its own, whilst nothing speaks more eloquently for its originality than the fact that of all the many medicinal plants no single one was European."

Elphinstone wonders at the knowledge of simples in which the Hindus early gave lessons to Europe and "more recently taught us the benefit of smoking Datura in asthma and the use of cowticeh against worms," and "the prescribing of Nux Vomica in paralysis and dyspepsia, and the revival of the use of Croton Tiglum" (Royle). In surgery, too, the modern surgeons of Europe have borrowed the Indian method of Rhinoplastic operation first made known to European surgeons by a letter which was printed in the Gentleman's Magazine for October 1794, p. 891. In fact Dr. Hirschberg of Berlin says that "the whole plastic surgery in Europe had taken its new flight when these cunning devices of Indian workmen became known to us. The transplanting of sensible skin flaps is also an entirely Indian method." The modern method of making pockets for the

¹ Neuberger, History of Medicine, vol. I., p. 54.

testicles under the Colles' fascia after the operation for scrotal tumour (elephantiasis) can be traced back to the age of Suśruta¹.

Thus we see that it can safely be affirmed that the medical science of Europe has been, both directly and indirectly, influenced by the Hindu System of Medicine.

पादो निरक्तमुच्चस्य जलेन प्रोत्य चालिषोऽ।
प्रवेश्य तन्वसेवना सुखो भीवेशतः परं ॥

Suśrata Saṃhitā, IV. ii.

THE END.

APPENDIX.

I^Tsing¹ says :—

"The following are the eight sections of medical science. The first treats of all kinds of sores; the second, of acupuncture for any disease above the neck; the third, of the diseases of the body; the fourth, of demoniac disease; the fifth, of the Agada medicine (i.e. antidote); the sixth, of the diseases of children; the seventh, of the means of lengthening one's life; the eighth, of the methods of invigorating the legs and body. 'Sores' (1) are of two kinds, inward and outward. The disease above the neck (2) is all that is on the head *and face*; any disease lower down from the throat is called a 'bodily' disease (3). The 'Demonicae' (4) is the attack of evil spirits, and the 'Agada' (5, but 6 of *Āyur-veda*) is the medicine for counteracting poisons. By 'Children' (6, but 5 of *Āyur-veda*) is meant from the embryo stage until after a boy's sixteenth year; 'lengthening life' (7) is to maintain the body so as to live long, while 'invigorating the legs *and body*' (8) means to keep the body and limbs strong and healthy. These eight arts formerly existed in eight books, but lately a man epitomized them and made them into one bundle. All physicians in the five parts of India practise according to *this book*, and any physician who is well versed in it never fails to live by the official pay. Therefore Indians greatly honour physicians and much esteem merchants, orf they do not injure life, and they give relief to others as well as benefit themselves. I made a successful study in medical

¹ A Record of Buddhist Practices, Ch. XXVII, pp. 127-8.

science, but as it is not my proper vocation I have finally given it up."

Dr. Takakusu¹ comments on the passage as follows :—

" The eight sections of Medicine which I-tsing describes are no doubt the eight divisions of the *Āyur-veda*. He mentions an epitomiser of these divisions, who seems to have been a famous physician and contemporary of I-tsing (or just before I-tsing). This epitomiser may be Susruta, who calls himself a disciple of Dhanvantari, one of the Nine Gems in the Court of Vikramāditya.

Prof. Wilson says in his Works, vol. iii, p. 274 :—

'The *Āyur-veda*, which originally consisted of one hundred sections, of a thousand stanzas each, was adapted to the limited faculties and life of man, by its distribution into eight subdivisions, the enumeration of which conveys to us an accurate idea of the subject of the *Ars Medendi* amongst the Hindus.'

The eight divisions are as follows :—

I. *Sālyā* (I-tsing's (1) cure of sores).

The art of extracting extraneous substances, grass, earth, bone, &c., accidentally introduced into the human body, and by analogy, the cure of all phlegmonoid tumours and abscesses. *Salyā* means a dart or arrow.

II. *Sālākya* (I-tsing's (2) art of acupuncture).

The treatment of external organic affections or diseases of the eyes, ears, nose, &c. It is derived from *Salākā*, "a thin and sharp instrument," and is borrowed from the generic name of the slender probes and needles used in operation on the parts affected.

¹ A Record of Bodhidharma's Practices, Ch. XXVII, pp. 222-3.

The above two divisions constitute the surgery of modern schools.

III. Kāya-kikitsā (I-tsing's (3) treatment of the diseases of the body).

The application of the Ars Medendi (*Kikitsā*) to the body in General (Kāya). It forms what we mean by the science of medicine.

IV. Bhūta-vidyā (I-tsing's (4) treatment of demoniac disease).

The restoration of the faculties from a disorganised state induced by demonical possession. The art vanished before the diffusion of knowledge, but it formed a very important branch of medical practice through all the schools, Greek, Arabic, or European.

V. Kaumāra-bhritya (I-tsing's (6) treatment of the diseases of children).

The care of infancy, comprehending not only the management of children from their birth, but the treatment of irregular lactic secretion, and puerperal disorders in mothers and nurses.

VI. Agada (I-tsing's (5) Agada medicine).

The administration of antidotes—a subject which, as far as it rests upon scientific principles, is blended with our medicine and surgery.

VII. Rāsāyana (I-tsing's (7) application of the means of lengthening one's life).

Chemistry, or more correctly alchemy as the chief end of the chemical combinations it describes, and which are mostly

metallurgic, is the discovery of the universal medicine—the elixir that was to render health permanent, and life perpetual.

VIII. *Vāgikarana* (I-tsing's (8) methods of invigorating the legs and body).

Promotion of the increase of the human race—an illusory research, which, as well as the preceding, is not without its parallel in ancient and modern times.'

Prof. Wilson further remarks:—'We have, therefore, included in these branches all the real and fanciful pursuits of physicians of every time and place. Susruta, however, confines his own work to the classes *Sālya* and *Sālākya* or surgery: although, by an arrangement not uncommon with our own writers, he introduces occasionally the treatment of general diseases and the management of women and children when discussing those topics to which they bear relation.' (See Wilson's Works, vol. iii, p. 276.)"

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